EQUIPMENT PROGRESS ISSUE

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NEARLY 500 LISTINGS OF NEW EQUIPMENT AND SERVICES INTRODUCED SINCE MAY 1959 PAGE 115

WORLD OIL

SPECIALIZED FOR EXPLORATION, DRILLING AND PRODUCING OPERATIONS AND MANAGEMENT

DECEMBER
1960

Big oil fields in Abo reef 91
Nitrogen aids production 96
Wyoming four-basin report 99
Reduce rod joint failures 105
Tool joint manual (Part 3) 109

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VOLUME 151, NO. 7 DECEMBER 1960

WORLD OIL

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ENGINEERING PRACTICES MANUAL NUMBER 3

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Part 3
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WORLD OIL published every month except semi-monthly in Feburary and August. Second class postage paid at Houston, Texas. ©Gulf Publishing Co. 1960.

A Quick Look

at This Issue

BUSY OIL MEN: To help you put first things first, scan these time-saving digests on this and the following pages, checking ☑ those you want to read first.

☐ **New pipe configuration reduces wall sticking** . . . Differential sticking is the unbalanced hydrostatic pressure which exists when there is a differential of unequalized hydraulic pressure across the pipe. This phenomena will result in an unbalanced pressure condition causing the pipe to be held against the wall of the bore hole. For an informative discussion of wall sticking and how this condition may be alleviated, turn to . . . **Page 83**

☐ **How to determine permeability from well log data . . .** Kewanee Oil Company is using a simple method based on well log information to determine formation permeability when core data are not available. Logs required are commonly used in salt mud systems, and include focused micrologs, sonic or neutron logs for porosity determination and a means for determining R_t. For an excellent case history of the company's experience in applying the technique to the San Andres formation of West Texas, see . . . . . **Page 88**

☐ **Abo reef play yielding large oil fields in southeast New Mexico . . .** Determination of back-reef and fore-reef facies via lithologic studies is the key to exploration along this prolific trend. Production has been proven in important fields along a narrow 60-mile east-west regional trend in Lea and Eddy counties; prospects indicate that it will be extended eastward into Gaines County, Texas, and possibly farther westward

along the Huapache Monocline in New Mexico. For a thorough study by a geologist who has been very active in the Abo reef trend development, turn to.....**Page 91**

☐ **Nitrogen can improve your production practices . . .** Liquid nitrogen units now in operation can deliver gas volumes of 175 Mcf at pressures to 10,000 psi. The gas has proven advantages in the following operations: well displacement on completion; perforating; acidizing; fracturing; spotting inhibitor, solvents or surfactants in the wellbore; cementing; controlling drilling mud weight in lost circulation areas, and testing surface equipment. For details on these new applications, see .....**Page 96**

☐ **Rocky Mountain four-basin report (Part 1)** . . . Some of the most significant oil and gas discoveries in Wyoming's history were made late in 1959 and during 1960. As a result, more than 35 percent of the current wildcats being drilled in the Rocky Mountain region are in Wyoming. The major part of this activity is concentrated in the Green River, Powder River, Wind River and Big Horn basins. For a timely, authoritative report on activity and geology of this active area, plus several informative maps and cross sections, turn to .....**Page 99**

☐ **How to reduce high tensile sucker rod joint failures . . .** A series of fatigue tests on 7/8-inch high tensile sucker rod joints has confirmed that make-up torque plays an important role in reducing string failure due to pin breakage. Results showed that 100 percent pin failure may be expected when joints are assembled with only 150 foot pounds torque. Joint torques of 400 and 650 foot pounds raised the fatigue strength of the joint to the general level of the rod body, and fewer pin failures occurred at 650 foot pounds than at 400 foot pounds. For a complete tabulation of results, see.....**Page 105.**

☐ **Care and maintenance of tool joints (Part 3)** . . . Most tool joint threads and shoulder damages, resulting from handling, can be repaired on the rig with hand files if detected early and corrected properly. Caution should be exercised so as not to excessively file the troubled high spots. This could result in additional tool joint failures. For a detailed description of these tool joint failures, and how they should be repaired, turn to .....**Page 109**

Coming in January . . .

A Special Report on North Africa

Oil Industry in Brief

Here are the latest industry trends, revealed by WORLD OIL and industry research.

Outlook improves. Rapid increase in refined product prices between June and September restored refiners' position to best level since early 1959. Improved market in third quarter indicates wider margins and better earnings for refiners in months ahead . . . See Page 25.

Demand up a little. If current business slack continues to mid-year, petroleum demand may not increase more than 2-3 percent during 1961. Jersey Standard says increase could be less than 1 percent . . . See Page 25.

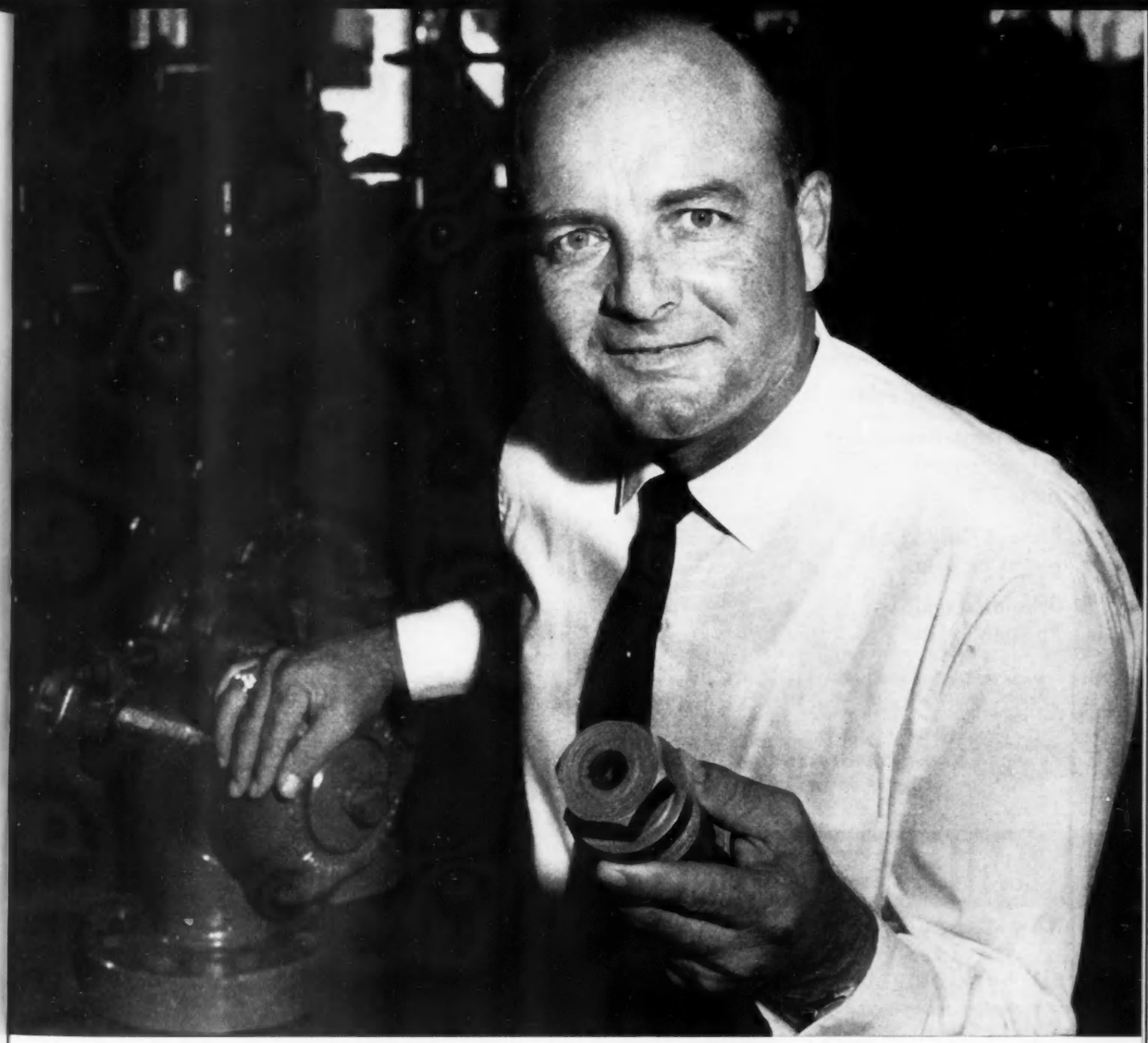
Crude stocks down. Recent imports cutback and continued rigid proration schedules have reduced U.S. crude stocks to 12-year low. However, at October's end gasoline stocks were 6.4 percent over year ago levels, compared with demand increase of only 1.3 percent . . . See Page 25.

Investors return. Value Line Investment Survey says, "Oil stocks are expected to outperform the market in 1961" . . . See Page 25.

Forecast hits the mark. Recent drilling trends indicate 46,100 new wells will be completed in 1961, only one half of one percent less than World Oil's mid-year forecast . . . See Page 28.

Completions increase. During October, 136 wells per day were completed, up 9 wells daily (8 percent) from September, and average was about even with October 1959 . . . See Page 28.

Rig totals drop. Operating rigs totaled 3,454 at October's end, down 283 or nearly 8 percent from September 30 . . . See Page 28.



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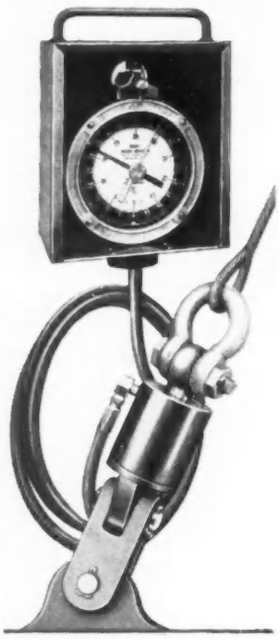

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WORLD OIL
Is Published By
GULF PUBLISHING COMPANY

EXECUTIVE OFFICES: 3301 BUFFALO DRIVE, HOUSTON
Cable Address, Gulfpubco, Houston
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Indexed by Industrial Arts Index and Engineering Index

Looking Ahead

API at a glance . . .

Editor's note: More than 6,300 oil industry representatives attended the 40th annual API meeting in Chicago last month. Were enough new and profitable ideas offered to justify this huge get-together? The answer must be "yes" for the session to have such a large turnout at a time when virtually every U.S. oil company is trimming its travel budget. Following are some of the more important thoughts to come out of the four-day exchange of ideas, opinions, predictions, and good will:

Reevaluation of API? . . . "It seems to me that it would be a good idea . . . if the Institute might undertake a reexamination of its objectives and policies. This might be initiated by the appointment by the chairman of a small group of thoughtful people. This group might be commissioned to consider present industry problems and the adequacy of API as presently structured and operated to deal with them."

Frank M. Porter, *President, American Petroleum Institute*

Needed: An accurate annual U.S. cost report . . . "It is my firm conviction that no time should be lost in conducting an annual, comprehensive, industry-wide study to determine the magnitudes of, and trends in, the cost of finding and developing oil and gas. I am aware that the problems involved . . . are formidable, but they are by no means insuperable."

John E. Hodges, *Economist and Director of Planning and Coordination, Hughes Tool Company*

Prorate drilling instead of production . . . "The 575,000 wells in this country produce roughly 12 barrels of oil per well per day. Compare this with the 1,104 wells in the whole of the Middle East on an extremely wide spacing pattern producing approximately 4,150 barrels per well per day. How can we hope to compete (with foreign production) and continue to drill wells on the basis of one well to 40 acres when one well to 80, 60, 160, or 320 acres will produce the same amount of oil? Proration of well drilling rather than proration of oil production would save billions of dollars. Unless the states deal with these problems, the federal government will do so. Most state regulations now merely encourage the drilling of unnecessary wells."

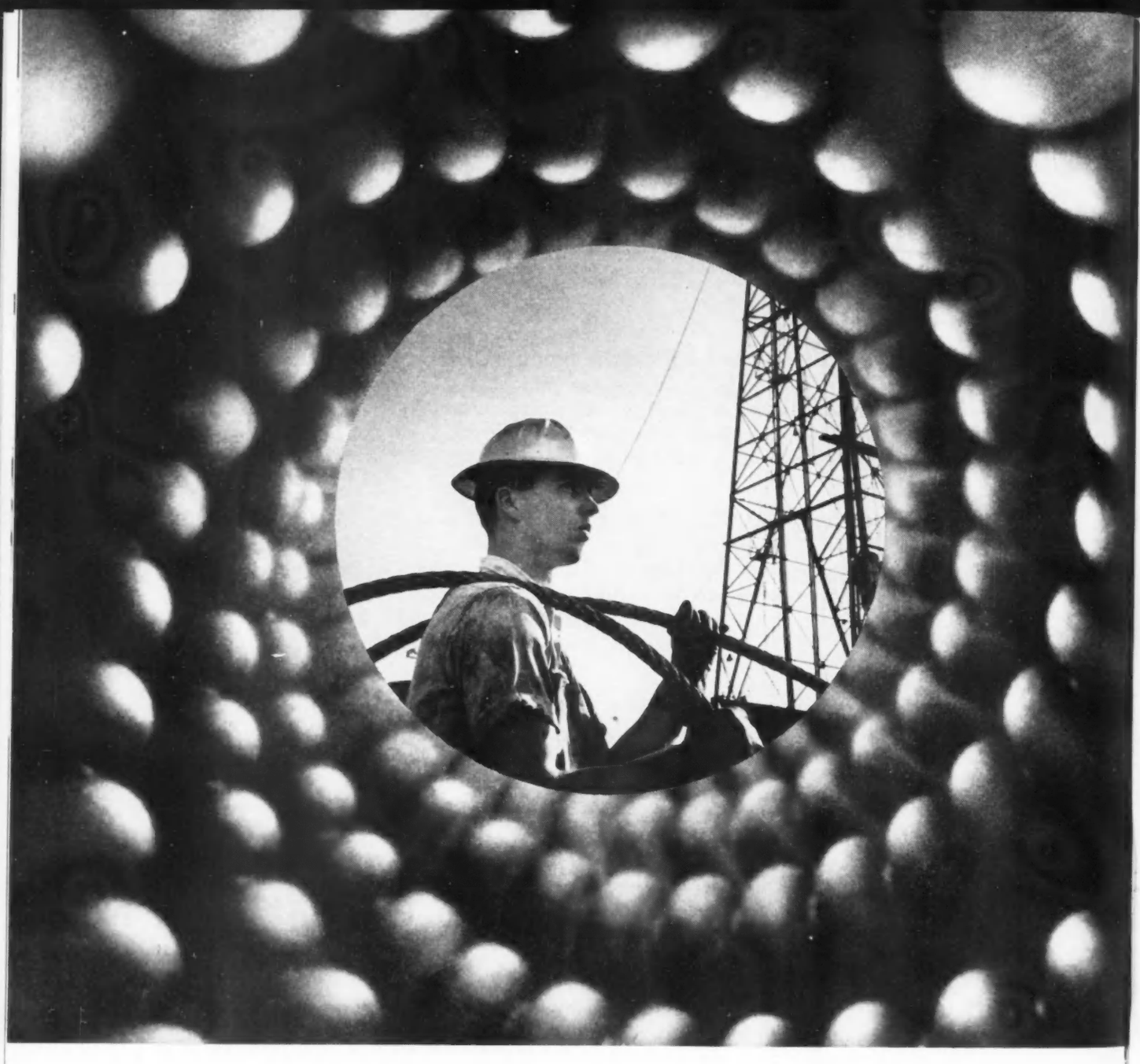
R. M. Williams, *Assistant General Attorney, Phillips Petroleum Company*

Oil has a story to tell—Tell it! . . . "Gentlemen, we are headed toward complete government control and, believe me, we are going to wind up in the same boat as the railroads and utilities unless we—you and I and all our employes—can reach the public with a better understanding of the oil industry. And we have no hope of reaching them unless we work at doing it."

Kerryn King, *Vice Chairman and Assistant to Chairman of the Board, Texaco Inc.*

Incremental cost theory is out of date . . . "There is an abundance of evidence that we have not faced up to the supply-demand imbalance. Despite the fact that it has been with us for three years, we have continued to develop and use unwisely too much capacity in nearly all phases of the business. The incremental cost theory may be reasonable under conditions of rapidly growing demand and a small margin of spare capacity. But neither of these conditions prevails today. By following the incremental cost approach we have simply aggravated the downward price spiral."

M. J. Rathbone, *President, Standard Oil Company (N.J.)*



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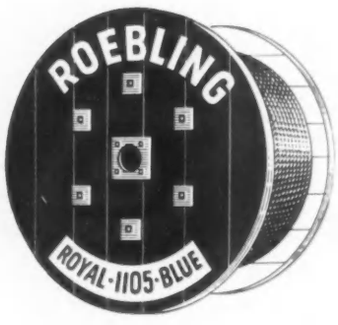

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A time for decision

He has no popular mandate. He barely squeaked by in electoral votes. He faces a strong coalition of Republicans and conservative Southern Democrats.

But, Senator John F. Kennedy does have the presidency. He has Lyndon Johnson who will continue to exert strong influence in Congress. He has the power of veto. And he has the Democratic platform to put into action, in addition to his many commitments to minority groups.

What does all this mean to the oil and gas industry? Considerable. Look at the President-elect's stand on some of the major issues:

Taxes. Kennedy will use his influence in Congress to make taxation a major lever of economic control. He will tighten pressure to close tax loopholes, but the domestic depletion provision has a good chance to survive. Overseas depletion may be a different matter. He is expected to urge help for business through new depreciation methods to make growth and investments more attractive. Tax-deferred pension plans for the self employed are a possibility.

Labor. He is expected to push for repeal of the Taft-Hartley clause permitting states to pass right-to-work laws. Weakening of the Taft-Hartley clause that forbids common-site picketing is likely. New efforts will be made to increase the minimum wage. Also, setting of uniform federal unemployment compensation at 66⅔ percent of a State's average weekly wage for 39 weeks, resulting in smaller employer rebate.

Federal regulation. The Interior Department and Federal Power Commission are expected to operate under a more strict policy, with generally tighter controls on business. A new natural gas bill will not be introduced without administration support. Congressmen supporting such a bill have made this clear.

National fuels policy. Kennedy pledged a comprehensive study of our nation's energy policies during his nomination campaign through West Virginia last spring. Coal's efforts to bring about end-use controls through this policy are continuing full pace. However, it will be at least a year before any action is taken one way or the other.

Imports. The new Administration will take early action on the entire U.S. import program, including a new means of allocating residual imports. There is a good chance for support of further crude oil import curbs.

Higher Taxes? Although many of the above appraisals look favorable for the oil and gas industry, Kennedy can be expected to exert considerable effort to put his multi-billion-dollar social welfare, military spending and federal aid programs through Congress. Thus, the next four years point toward higher taxes and tighter federal control of business—both of which are negative factors in the expansion of the U.S. business economy. That is, unless strong measures are taken to ease the burden elsewhere.

That is where industry comes in. It cannot sit back in sublime complacency and let the trend continue toward tighter federal control of our economy. An all-out effort must be made to give the public an economics lesson it can understand. And this is not a one-industry job.

Oil, steel, automobile and every other industry that does not want to sacrifice its economic freedom for federal subsidy should join in one united effort. Labor unions, social welfare proponents, and those wanting more and more federal handouts unite with considerable success, why can't industry?

Now is the time for decision. Not tomorrow.

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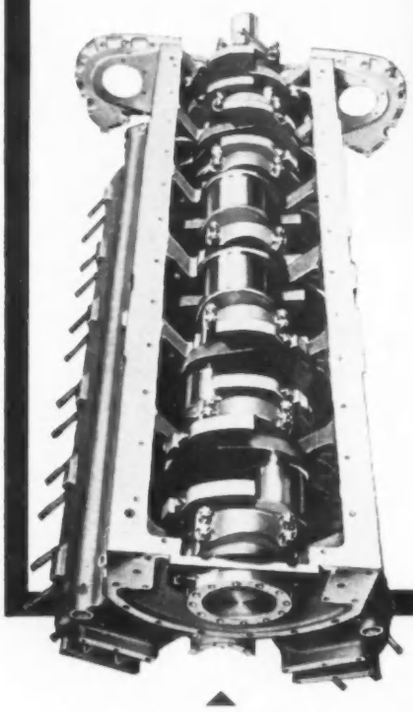
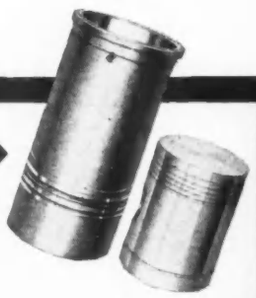
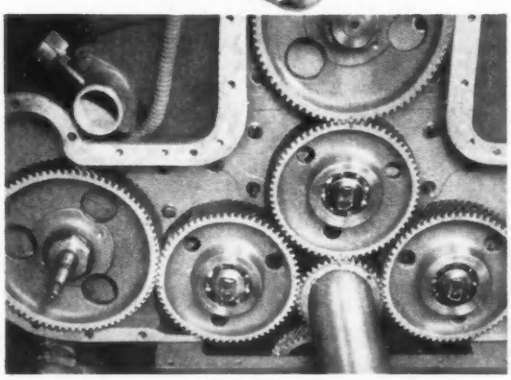


Crankshaft and main bearings in place in a typical Waukesha V-12 oil field engine. Note heavy flanges, thick bearing webs, rugged long-life construction.

Precision-built and balanced rod assemblies, matched with pistons. Pressure oiled, mirror smooth, heavy pins. Replaceable bearing shells.

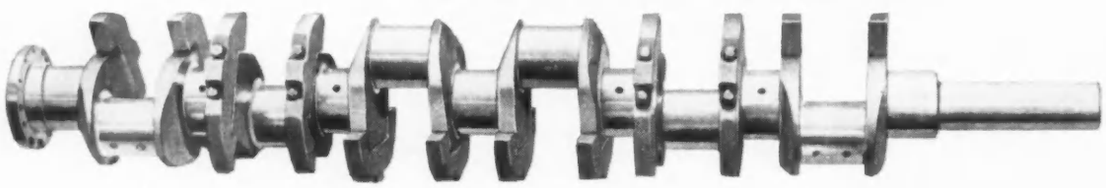


Removable wet cylinder sleeves of close-grained alloy iron, finished for oil retention and long life. Heavy duty, aluminum alloy, oil-cooled pistons.



Wide-faced helical cut timing gears are flood oiled. Materials selected for long, quiet life and accuracy. Gears and all elements in the power train, from pistons to flywheel, are precision-machined in Waukesha shops under Waukesha Quality Control.

Rifle-drilled, drop-forged, heat-treated crankshafts, precision-ground to exacting Quality Control standards. Note extra large bearing areas. Statically and dynamically balanced.



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Good results expected to continue into 1961

Supply and demand are being balanced through strict control of crude production and imports. Prices are steady in firm markets. But gasoline stocks are too large

By World Oil Staff

The improved situation of the oil industry, dating from midyear, is being made secure, and there are hopes for good results on through the first half of 1961.

Greatly helping to keep markets firm is the continued effective balancing of supplies with demand. Domestic production of crude oil remains strictly controlled, despite the scheduled seasonal increase of Texas allowables in December. Imports of crude and products likewise are assured of being held within moderate bounds by the import allowables.

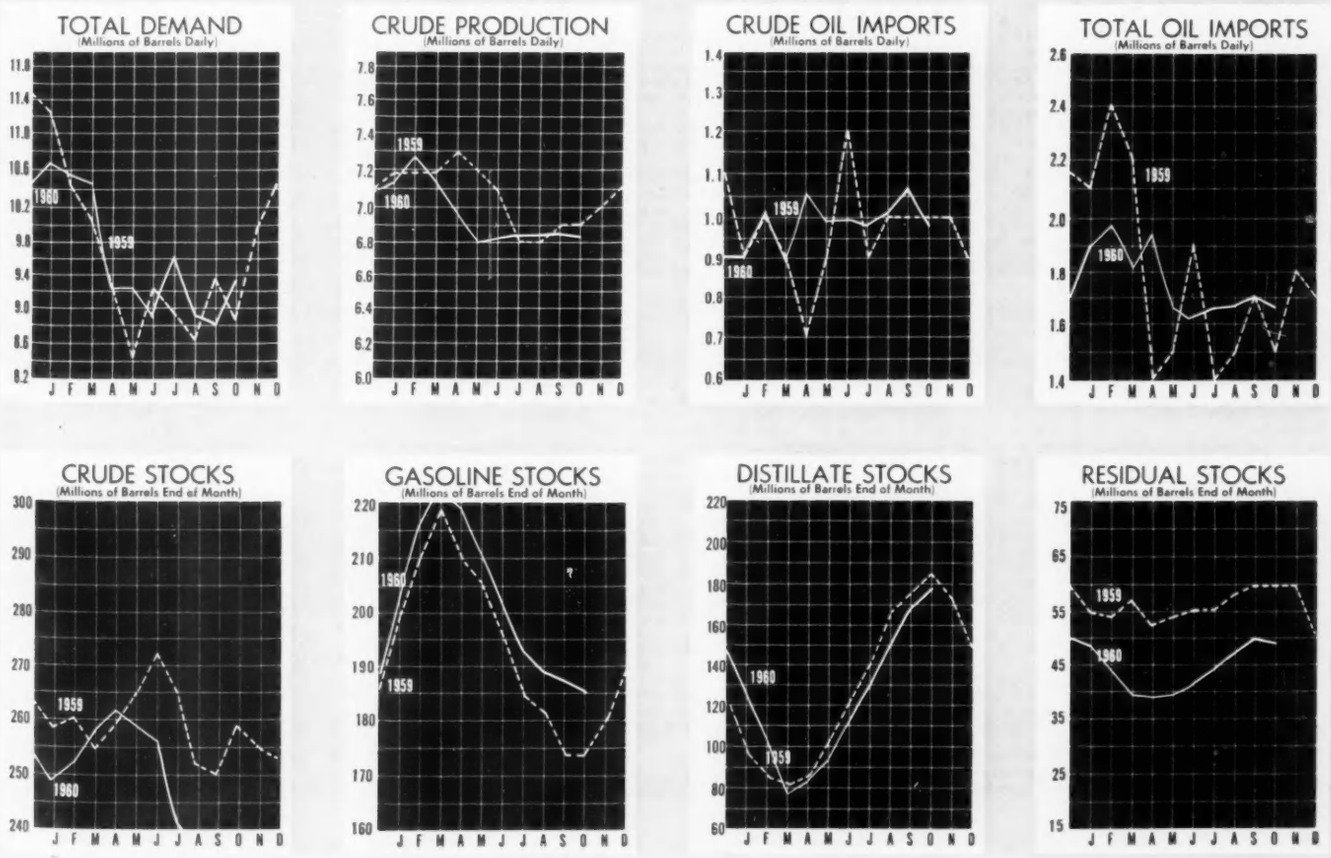
Crude runs to stills necessarily must be kept reasonable because excessive supplies of crude are not available, with new supplies curtailed and stocks of crude at a 12 year low. With runs to stills thus restricted, production and stocks of refined products must be held within satisfactory limits.

Outlook Good. That the oil industry situation is now relatively favorable is attested by the better rating it is gaining among investors and investment counselors. As an example, the Value Line Investment Survey of November 14 stated that "Oil stocks are expected to outperform the market in the coming year. The domestic integrated oil companies are out of the woods. A rapid rise in refined product prices between June and September restored the refiners' spread to the best level since early 1959. Third quarter reports mirrored the improved marketing climate within the U.S. The domestic refiners should enjoy wider margins and rising earnings in the months ahead. Their earnings comparisons are expected to remain favorable through mid-1961."

Regarding international oil companies, the same survey is less hopeful. "While their U.S. earnings will benefit from the improved climate for domestic refiners, their foreign earnings are expected to decline," it stated. "Excess supplies of crude are competing for world markets, driving prices down. The governments of the leading producing countries are stoutly resisting any drop in their income from oil. It looks as if all the decline in foreign earnings will have to be absorbed by the oil companies."

A favorable outlook for the oil industry is seen, while there are general expectations that the present business recession will be over about the middle of 1961. The business slow-down is expected to keep petroleum demand from increasing by more than 2 to 3 percent in 1961. But this mod-

Petroleum Trends...



U.S. Petroleum Demand and Supply (Thousands Bbls. Daily)

ITEM	OCTOBER 1960	OCTOBER 1959	% Diff.	Sept. 1960	JANUARY-OCTOBER 1960	JANUARY-OCTOBER 1959	% Diff.
DEMAND							
All Oils, Total Demand	9,325	8,906	+ 4.7	8,817	9,664	9,486	+ 1.9
Domestic Demand	9,125	8,663	+ 5.3	8,605	9,454	9,241	+ 2.3
Export Demand	200	243	—17.7	212	210	245	—14.3
Gasoline, Total Demand	4,110	3,953	+ 4.0	4,254	4,189	4,137	+ 1.3
Distillate, Total Demand	1,450	1,514	— 4.2	1,309	1,757	1,723	+ 2.0
Kerosine, Total Demand	339	262	+29.4	319	335	274	+22.3
Residual, Total Demand	1,319	1,316	+ 0.2	1,236	1,533	1,557	— 1.6
Other Oils, Total Demand	2,107	1,861	+13.2	1,699	1,850	1,795	+ 3.1
CHANGE IN STOCKS							
All Oils, Change in Stocks	+116	+428		+683	+57	+185	—69.2
NEW SUPPLY							
Total New Supply	9,441	9,334	+ 1.1	9,500	9,721	9,671	+ 0.5
Domestic Production, Total	7,762	7,797	— 0.5	7,784	7,917	7,915	
Crude Oil	6,822	6,911	— 1.3	6,859	6,989	7,047	— 0.8
Natural Gas Liquids	940	886	+ 6.1	925	927	868	+ 6.8
Imports, Total	1,679	1,537	+ 9.2	1,716	1,804	1,756	+ 2.7
Refined Products	721	556	+29.7	639	785	798	— 1.6
Crude Oil, Total	958	979	— 2.2	1,077	1,019	957	+ 6.5
Crude, East of California	699	720	— 2.9	751	746	732	+ 1.9
CRUDE RUNS							
Crude Runs to Stills	7,905	7,647	+ 3.4	8,068	7,979	7,979	+ 1.3
Domestic Crude	6,812	6,669	+ 2.1	6,990	7,028	7,028	+ 0.4
Foreign	1,093	978	+11.8	1,078	951	951	+ 8.4

U.S. Stocks of Oils (Million Bbls. at End of Month)

KIND OF OIL	TOTAL IN U.S. Oct. 1960	TOTAL IN U.S. Oct. 1959	% Diff.	TOTAL IN U.S. Sept. 1960	EAST OF CALIFORNIA Oct. 1960	EAST OF CALIFORNIA Oct. 1959	% Diff.	EAST OF CALIFORNIA Sept. 1960
All Oils	823.9	845.9	— 2.6	820.3				
Crude Oil	231.3	257.5	—10.2	231.9	200.4	224.0	—10.5	217.7
Gasoline	185.4	174.3	+ 6.4	187.6	159.4	149.3	+ 6.8	161.4
Distillate Fuel Oil	179.8	181.8	— 1.1	169.0	165.9	166.3	— 0.3	154.7
Kerosine	36.7	32.4	+13.3	35.1	35.3	32.0	+10.3	33.8
Residual Fuel	49.4	59.5	—17.0	50.4	33.7	33.4	+ 0.9	33.1
Other Oils	141.3	140.4	+ 0.6	146.3				

U.S. Crude Oil Production, by States (Thous. Bbls.)

STATE or DISTRICT	Daily Average for Month Oct. 1960	Oct. 1959	% Diff.	Sept. 1960	Total, January-October 1960	1959	% Diff.
Alabama	19.9	14.9	+ 33.6	18.8	5,876	4,139	+ 42.0
Arkansas	77.4	62.6	+ 23.6	78.1	23,848	22,371	+ 6.6
California	824.7	836.9	— 1.5	826.9	253,416	256,255	— 1.1
Colorado	132.1	128.5	+ 2.8	131.0	39,193	38,362	+ 2.2
Florida	1.0	1.2	— 16.7	1.0	317	354	— 10.5
Illinois	217.9	215.2	+ 1.3	217.8	65,902	65,170	+ 1.1
Indiana	31.7	32.2	— 1.6	31.6	9,702	10,026	— 3.2
Kansas	302.0	325.6	— 7.3	298.4	93,472	99,562	— 6.1
Kentucky	54.5	69.6	— 21.7	57.0	18,017	22,375	— 19.5
Louisiana	1,071.6	1,017.5	+ 5.3	1,074.2	324,948	290,987	+ 11.7
North Louisiana	110.5	129.2	— 14.5	110.8	37,380	37,594	— 0.6
South Louisiana	961.1	888.3	+ 8.2	963.4	287,568	253,393	+ 13.5
Michigan	45.1	29.6	+ 52.4	41.7	12,068	8,386	+ 43.9
Mississippi	138.7	141.8	— 2.2	135.6	42,707	39,111	+ 9.2
Mo.-So. Dak.-Tenn.	0.8	0.7	+ 14.3	0.8	276	83	+232.5
Montana	83.2	82.0	+ 1.5	82.3	25,112	25,032	+ 0.3
Nebraska	66.9	69.2	— 3.3	67.9	20,214	19,546	+ 3.4
Nev.-Wash.-Alaska-Ariz.	1.0	1.0		1.0	270	191	+ 41.4
New Mexico	291.8	288.7	+ 1.1	288.6	90,005	87,590	+ 2.8
Southeast	255.5	250.0	+ 2.2	253.3	76,651	75,538	+ 1.5
Northwest	36.3	38.7	— 6.2	35.3	13,354	12,052	+ 10.8
New York	4.8	5.4	— 11.1	4.8	1,516	1,647	— 8.0
North Dakota	62.9	37.0	+ 70.0	59.4	17,907	14,595	+ 22.7
Ohio	12.2	14.8	— 17.6	12.4	4,098	4,690	— 12.6
Oklahoma	497.9	524.2	— 5.0	486.9	159,248	162,959	— 2.3
Pennsylvania	16.8	17.3	— 2.9	17.3	5,245	5,066	+ 3.5
Texas	2,416.3	2,527.9	— 4.4	2,460.2	776,146	823,595	— 5.8
Dist. 1: South Central	45.5	44.5	+ 2.2	44.4	13,481	13,784	— 2.2
Dist. 2: Middle Gulf	104.3	109.9	— 5.1	105.8	34,247	35,962	— 4.8
Dist. 3: Upper Gulf	332.3	350.1	— 5.1	341.5	107,875	116,455	— 7.4
Dist. 4: Lower Gulf	183.5	178.4	+ 2.9	184.3	57,147	58,287	— 2.0
Dist. 5: East Central	25.3	27.2	— 7.0	26.3	8,229	9,139	— 10.0
Dist. 6: Northeast	231.3	240.6	— 3.9	242.3	74,770	80,493	— 7.1
Dist. 7-B: North Central	121.2	131.9	— 8.1	128.9	39,221	41,674	— 5.9
Dist. 7-C: West Central	116.7	118.5	— 1.5	115.9	36,999	39,094	— 5.4
Dist. 8: West	958.9	974.5	— 1.6	966.6	306,914	322,039	— 4.7
Dist. 9: North	195.6	201.8	— 3.1	196.5	59,549	62,884	— 5.3
Dist. 10: Panhandle	101.7	107.9	— 5.8	107.7	32,861	32,764	+ 0.3
Utah	82.2	107.1	— 23.3	99.6	30,872	33,428	— 7.7
Virginia					4	5	— 20.0
West Virginia	6.5	6.3	+ 3.2	6.9	1,922	1,816	+ 5.8
Wyoming	362.3	354.0	+ 2.3	358.3	109,427	104,831	+ 4.4
Total, United States	6,822.2	6,911.2	— 1.3	6,858.5	2,131,728	2,142,172	— 0.5

Sources for above 3 tables: Bureau of Mines monthly reports, except last two months based on API and B. of M. weekly reports and WORLD OIL estimates, and Texas districts from API.

erate gain, coupled with absence of surpluses of oils, promises firm markets and favorable earnings.

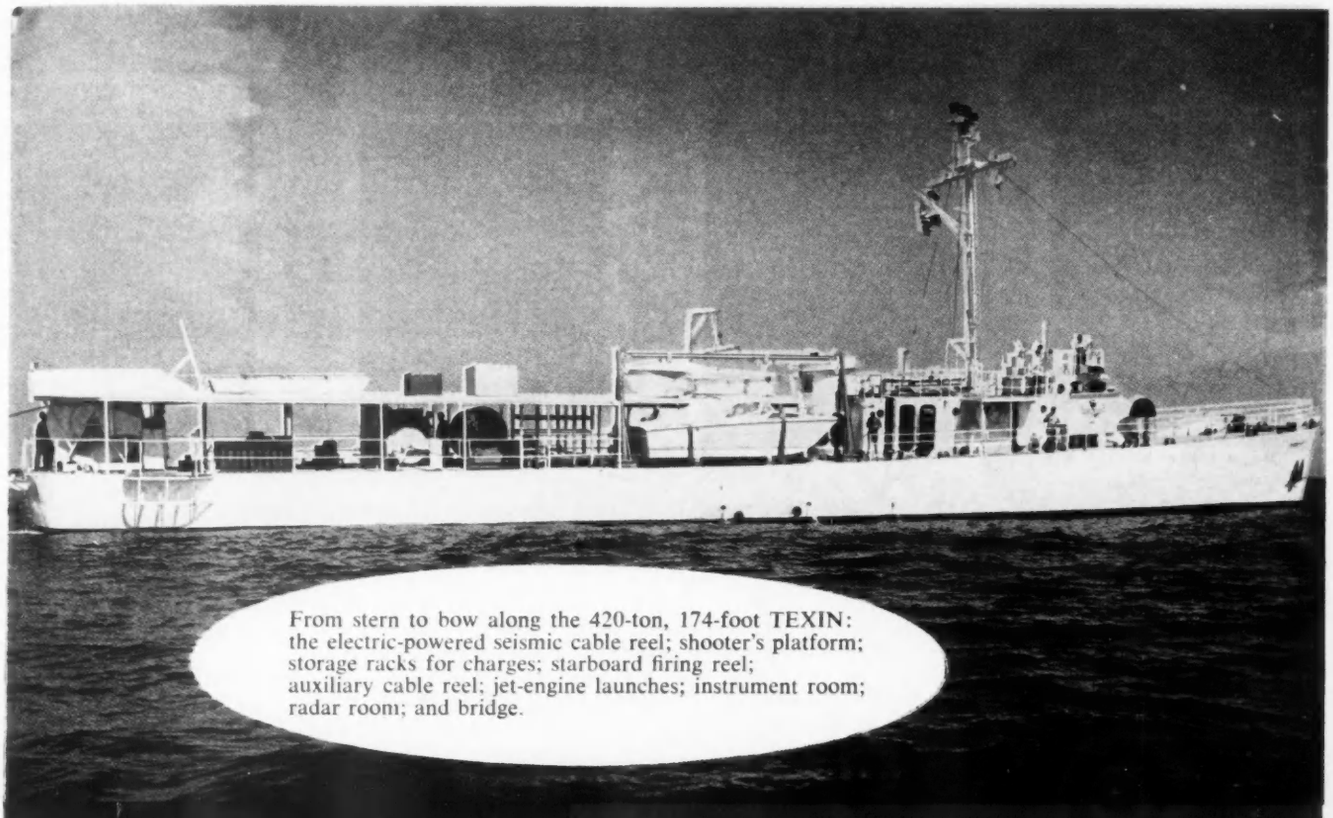
Heating Oils. During the next several months, sales of heating oils will be of great importance in determining oil industry profits. These oils will be consumed in seasonally heavy volumes. Significantly affecting the demand will be the weather. It is hoped that the weather will be at least normal during the coming winter, whereas it was warmer than normal last winter.

Stocks of distillate fuel oil at the end of October were 2 million barrels lower than one year previously. So far in 1960, demand for distillate has been 2 percent larger than in 1959. The markets for distillate have been firm. There are good grounds for hoping that the coming heating season will be more profitable than that a year ago.

Gasoline. The most important hazard now confronting the industry is the possibility that gasoline stocks may be expanded excessively during the winter. Gasoline demand has been disappointing during most of 1960, although it was good in October. For the first 10 months of 1960, there was an increase of only 1.3 percent over the like period a year earlier, though a gain of 4 percent was indicated in October. Slowing the growth of gasoline demand are the business recession and the widespread shifting of motorists to compact cars.

With gasoline demand lagging, stocks of gasoline have been larger than needed. At the end of October, gasoline stocks were 11 million barrels or 6.4 percent higher than one year previously, totaling 185.4 million barrels. This 6.4 percent increase in stocks was not justified by the gain of only 1.3 percent in gasoline demand in 1960. The excessive gasoline stocks represent a definite danger and call for special attention of the industry.

While a cold winter would assure good profits from heating oils, it might have offsetting ill effects on future gasoline markets. In cold weather, gasoline use is retarded and production of gasoline may be excessive in connection with making large volumes of heating oils. These possibilities are especially disquieting now, in view of the fact that gasoline stocks already are excessive.



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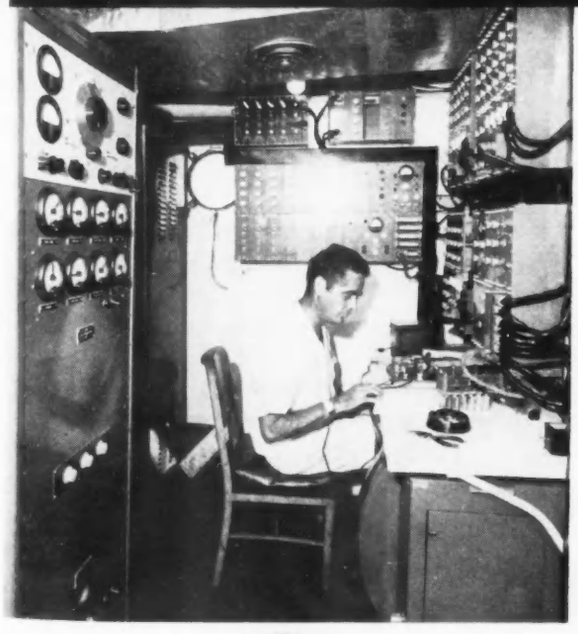

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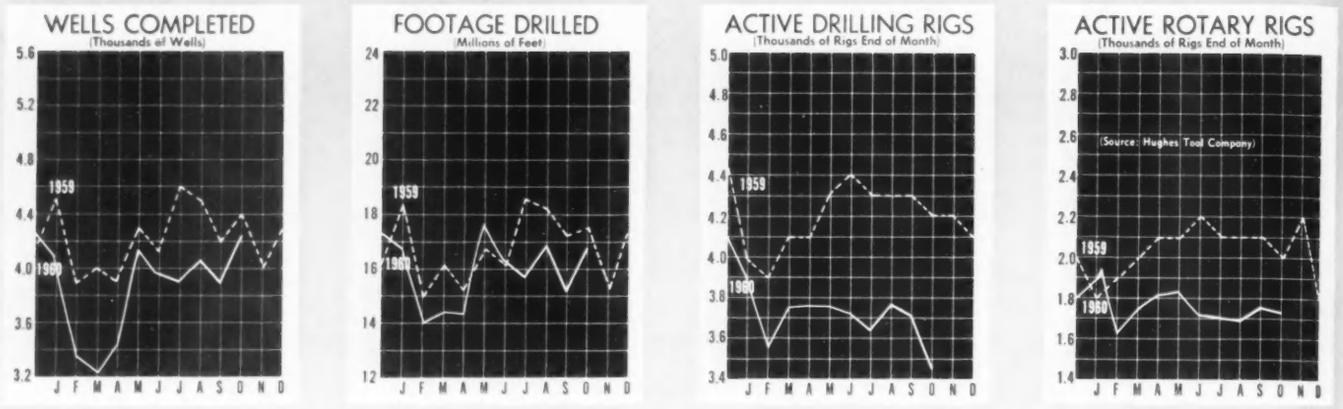
Drilling Activities.



October completions up 7 percent

By World Oil Staff

Recent drilling trends indicate U.S. operators will complete about 46,100 new wells in 1960, only 224 wells or one half of 1 percent less than World Oil's mid-year forecast—and 5.5 percent less than the forecast made 12 months earlier.

During October, an average of 136 new wells per day were completed, up 9 wells daily (7 percent) from September. The October average held almost steady with the same 1959 period.

Rigs operating totaled 3,454 at October's end, down 283 or nearly 8 percent from September 30, and down 519 rigs or 12.7 percent from October 31, 1959.

Footage drilled averaged 541,930 feet per day in October, up 38,600 feet per day or 7.6 percent from the September average. However, the October record was down 4.5 percent from the 567,742 feet per day drilled during October 1959.

Wildcat drilling in October held about even with September, averaging 24 wells per day. However, the average was down 20 percent from the 30 wells per day average reported during October 1959.

Summary of U.S. Drilling Activity

ITEM	October 1960	September 1960	TEN MONTHS JANUARY-OCTOBER 1960	1959	% Diff.
New Wells Completed:					
Oil	1,996	1,764	18,409	21,482	—14.3
Distillate	70	56	658	685	— 3.9
Gas	404	373	3,529	3,347	+ 5.4
Dry	1,617	1,469	15,099	15,505	— 2.6
Service	117	147	1,005	946	+ 6.2
Total New Wells	**4,204**	**3,809**	**38,700**	**41,965**	**— 7.8**
Footage Drilled (Millions of Feet)	**16.8**	**15.1**	**160.0**	**172.9**	**— 7.5**

Summary of U.S. Wildcat Drilling

ITEM	October 1960	September 1960	TEN MONTHS JANUARY-OCTOBER 1960	1959	% Diff.
New Field Discoveries:					
Oil	48	45	462	587	—21.3
Distillate	4	5	59	76	—22.4
Gas	19	23	213	217	— 1.9
Total Discoveries	**71**	**73**	**734**	**880**	**—16.6**
Dry Wildcats	**677**	**655**	**6,871**	**7,301**	**— 5.9**
Total Wildcats	**748**	**728**	**7,605**	**8,181**	**— 7.1**
(Percent Productive)	**9.5**	**10.0**	**9.7**	**10.7**	.....
(Percent Dry)	**90.5**	**90.0**	**90.3**	**89.3**	.....

How one operator used D-Gassers to

reduce gas well costs by about $55,000

A Canadian operator — drilling deep gas wells in the Alberta foothills — is using the SWACO D-Gasser to save about $55,000 per well. Here is how he does it:

This operator, who was developing a gas field in the Alberta foothills, was encountering a gas-cutting problem during drilling that increased costs seriously. The problem was high-pressure, low-volume gas accumulations in a shale section above the main pay or between pay zones.

Until this shale section was reached, mud weight of 10 pounds per gallon was carried. When this section was being penetrated, however, severe gas cutting and "blowing" occurred. The gas cutting then persisted in the form of a two to three hour trip gas for the remainder of the well.

Practice before using D-Gasser

The operator circulated until he could build mud weight up to 11-13 pounds per gallon to control the gas cutting. Lost circulation in the pay section frequently occurred with the heavy mud, and a great deal of lost circulation material was often required. The cost of mud materials to control both gas and lost circulation ran $25,000 or more per well.

Initially, it took anywhere from two days to a week to condition the mud, and in one case it was necessary to set casing before drilling could proceed. In addition, several hours of rig time were lost after each trip gunning out the trip gas.

Practice when using D-Gasser

With a D-Gasser installed, the operator merely starts it up when the gas cutting occurs. Occasionally the preventers have to be closed, and the well placed on choke for a few hours. However, the whole job of mud conditioning can be accomplished in less than one day without increasing the mud weight. Moreover, penetration rates and bit life while drilling using the lower weight muds are substantially improved. Total savings in drilling costs amount to approximately $30,000 per well.

To summarize, the operator has found he saves $25,000 or more in mud costs and something like $30,000 in rig time and other drilling costs.

This case is just one of many examples that prove the SWACO D-Gasser is more than just a safety device to be used for wildcat drilling. It makes possible important reductions in overall well costs in any area where gas cutting is a problem. Contact your nearest SWACO representative to find out just how much D-Gassers can reduce your costs. Also ask him how SWACO Clayjectors and D-Sanders can further reduce drilling costs.

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U.S. Drilling Activity in October and First Ten Months, 1960-1959

STATE or DISTRICT	TOTAL NEW WELLS COMPLETED AND FOOTAGE DRILLED: DETAILS FOR OCTOBER, 1960 — Oil	Dist.	Gas	Dry	Service Wells	TOTAL NEW WELLS — Oct. 1960	Sept. 1960	Oct. 1959	Total Footage October 1960	DETAILS FOR JANUARY-OCTOBER — NEW WELLS — 1960	1959	% Diff.	FOOTAGE — 1960	1959	WILDCAT DRILLING IN OCTOBER AND FIRST TEN MONTHS, 1960-1959 — DETAILS FOR OCTOBER, 1960 — Oil	Dist.	Gas	Dry	Total Wildcats	DETAILS FOR JANUARY-OCTOBER — Oil	Dist.	Gas	Dry	TOTAL WILDCATS — 1960	1959	DRILLING RIGS IN OPERATION (Rigging up, Drilling, Temp. Shut-down) — Oct. 31, 1960	Sept. 30, 1960	Oct. 31, 1959
Alabama	8	....	....	1	....	9	5	7	68,456	48	90	— 46.7	448,644	810,467	....	....	....	1	1	....	....	....	7	7	28	8	4	9
Alaska	3	....	....	2	....	5	2	2	39,428	18	8	+125.0	183,603	89,638	....	....	....	2	2	1	....	1	6	8	7	8	8	7
Arizona	....	....	....	5	....	5	1	3	9,836	25	22	+ 13.6	66,197	67,979	....	....	....	4	4	1	....	....	20	21	21	7	7	5
Arkansas	36	....	3	20	....	59	56	81	192,693	492	687	— 28.4	1,758,162	2,300,488	....	....	....	7	7	3	1	3	95	102	106	44	31	48
California	127	....	8	44	....	179	115	142	717,546	1,263	1,208	+ 4.6	5,630,265	5,840,271	1	....	1	25	27	7	....	8	227	242	258	121	133	139
Colorado	10	....	10	37	....	57	52	80	298,681	523	634	— 17.5	2,685,171	3,341,190	1	....	1	20	22	14	....	8	234	256	337	97	85	40
Illinois	105	....	1	117	....	223	152	170	491,040	1,675	1,699	— 1.4	3,539,806	3,766,096	1	....	....	60	61	7	....	1	542	550	409	263	213	303
Indiana	24	....	3	85	3	115	73	97	156,116	880	737	+ 19.4	1,184,361	1,164,373	....	....	....	31	34	5	....	....	292	297	205	105	100	121
Kansas	189	....	23	183	25	420	384	384	1,473,198	4,092	3,881	+ 5.4	14,377,643	13,844,639	4	....	1	52	57	71	....	21	614	706	956	240	245	294
Kentucky	139	....	20	115	....	274	236	427	212,409	2,428	3,129	— 22.4	1,942,786	2,628,376	2	....	....	4	6	10	....	1	42	53	76	146	155	190
Louisiana	117	23	41	141	....	322	285	333	2,405,851	2,900	3,177	— 8.7	22,822,493	24,696,707	2	2	2	52	58	27	13	7	400	447	452	312	329	333
North Louisiana	49	....	29	74	....	152	127	144	583,873	1,106	1,232	— 10.2	4,201,021	4,374,418	1	....	1	24	26	12	....	2	177	191	171	60	61	67
South Louisiana	68	23	12	67	....	170	158	189	1,821,978	1,794	1,945	— 7.8	18,621,472	20,322,289	1	2	1	28	32	15	13	5	223	256	281	252	268	266
*Gulf of Mexico	18	6	....	15	....	39	41	41	367,119	432	397	+ 8.8	4,400,838	4,105,456	....	....	....	5	5	....	2	1	29	32	31	54	61	54
Michigan	37	....	3	56	....	96	75	59	353,145	700	482	+ 45.2	2,570,599	1,487,598	1	....	....	35	36	9	....	3	196	208	129	103	120	102
Mississippi	27	1	5	27	....	60	56	63	599,445	580	548	+ 5.8	5,755,182	5,101,362	2	....	....	14	16	17	....	1	185	203	205	63	68	69
Missouri	....	....	....	....	....	....	1	....	....	10	12	— 16.7	26,963	9,901	....	....	....	....	....	....	....	....	1	1	10	2	....	2
Montana	11	....	1	23	....	35	32	45	158,407	250	273	— 8.4	1,223,483	1,327,890	1	....	1	11	13	7	....	3	95	105	88	25	23	42
Nebraska	15	....	....	66	....	81	47	77	427,543	789	719	+ 9.7	4,404,803	4,285,038	4	....	....	51	55	24	....	1	341	366	322	22	33	24
New Mexico	87	....	34	37	2	160	133	166	737,833	1,518	1,456	+ 4.3	7,392,268	6,084,575	3	....	2	17	22	52	....	34	214	300	219	146	142	166
Southeast	71	....	3	27	....	101	87	104	451,497	1,012	805	+ 25.7	5,116,833	3,818,666	3	....	....	10	13	35	....	10	160	205	150	76	80	97
Northwest	16	....	31	10	2	59	46	62	286,336	506	651	— 22.3	2,275,435	2,265,909	....	....	2	7	9	17	....	24	54	95	69	70	62	69
New York	19	....	6	1	8	34	36	24	45,035	268	231	+ 16.0	436,450	397,580	....	....	....	....	....	....	....	....	....	....	....	25	25	25
North Dakota	10	....	....	11	....	21	25	20	148,395	237	354	— 33.1	1,485,449	2,235,379	....	....	....	7	7	6	....	....	53	59	62	15	15	27
Ohio	45	....	18	25	....	88	112	114	231,068	846	832	+ 1.7	2,071,472	2,157,305	1	....	1	5	7	3	....	7	33	43	23	126	128	213
Oklahoma	222	7	25	116	32	402	379	385	1,499,244	3,816	4,686	— 18.6	14,412,546	17,179,503	8	1	2	30	41	41	7	31	310	389	630	408	452	468
Pennsylvania	32	....	23	16	13	84	75	63	230,483	740	568	+ 30.3	2,047,510	1,785,571	....	....	1	5	6	....	....	6	15	21	20	66	175	189
South Dakota	....	....	....	2	....	2	....	4	9,296	18	15	+ 20.0	127,687	99,395	....	....	....	2	2	....	....	....	8	8	9	1	2	2
Tennessee	2	....	1	9	....	12	11	6	8,419	79	92	— 14.1	62,804	92,356	1	....	....	7	8	3	....	3	46	52	46	25	30	25
Texas	659	38	109	408	33	1,247	1,260	1,514	5,476,829	12,674	14,836	— 14.6	56,118,846	65,495,122	16	1	4	195	217	138	37	59	2,556	2,790	3,230	776	838	973
Dist. 1: South Central	48	3	3	44	2	100	130	85	261,457	935	799	+ 17.0	2,415,058	2,051,307	....	....	....	27	27	3	1	2	270	276	255	40	38	39
Dist. 2: Middle Gulf	10	14	16	23	....	63	62	77	426,888	647	667	— 3.0	4,315,605	4,180,672	2	....	....	15	17	7	11	7	180	205	241	48	42	42
Dist. 3: Upper Gulf	35	11	3	37	....	86	81	83	665,566	939	991	— 5.3	6,749,797	7,052,352	1	1	1	23	26	7	13	4	217	241	235	82	81	107
*Gulf of Mexico	....	....	....	....	....	....	....	....	....	5	2	+150.0	48,184	20,256	....	....	....	....	....	....	....	....	3	3	2	2	1	2
Dist. 4: Lower Gulf-S.W.	29	10	8	35	....	82	91	112	414,718	873	1,133	— 23.0	4,851,105	6,119,721	....	....	....	21	21	10	9	13	252	284	349	72	62	81
*Gulf of Mexico	....	....	....	....	....	....	....	....	....	....	1	—100.0	....	500	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Dist. 5: East Central	2	....	3	16	....	21	22	17	112,753	177	125	+ 41.6	872,448	649,217	....	....	1	9	10	2	1	4	92	99	55	13	16	▲19
Dist. 6: Northeast	52	....	9	21	....	82	79	62	450,972	728	692	+ 5.2	3,912,868	3,784,812	....	....	....	13	13	5	2	3	142	152	143	54	82	▼57
Dist. 7-B: North Central	89	....	5	72	2	168	169	216	507,202	1,846	2,029	— 9.0	5,488,950	6,520,993	2	....	....	38	40	42	....	10	514	566	669	77	79	104
Dist. 7-C: West Central	32	....	2	24	1	59	81	66	214,996	660	640	+ 3.1	2,688,298	2,731,325	2	....	1	11	14	15	....	6	175	195	210	73	52	61
Dist. 8: West	179	....	16	34	7	236	233	390	1,337,721	2,557	3,821	— 33.1	14,365,286	19,564,153	6	....	....	13	19	35	....	5	291	331	482	145	202	243
Dist. 9: North	129	....	11	76	15	231	240	273	592,389	2,362	2,892	— 18.3	6,184,134	8,087,742	3	....	1	19	23	12	....	1	359	372	461	113	125	134
Dist. 10: Panhandle	54	....	33	26	6	119	72	133	492,167	950	1,017	— 9.3	4,275,297	4,752,828	....	....	....	7	7	....	....	4	64	68	130	59	59	86
Utah	6	....	4	7	....	17	10	16	100,414	174	227	— 23.4	994,278	1,274,011	....	....	1	5	6	2	....	7	58	67	60	38	43	25
Washington	....	....	....	1	....	1	....	1	5,290	3	3	....	17,372	21,108	....	....	....	....	....	....	....	....	2	2	3	1	2	2
West Virginia	23	....	60	14	....	97	125	71	248,615	825	651	+ 26.7	2,092,629	1,657,674	....	....	....	....	....	....	....	....	....	....	1	194	250	142
Wyoming	43	1	6	38	1	89	70	90	477,810	805	693	+ 16.2	4,049,507	3,610,525	....	....	2	21	23	14	1	8	256	279	259	58	69	83
Others	....	....	....	10	....	10	1	3	18,217	24	15	+ 60.0	104,732	86,646	....	....	....	10	10	....	....	....	23	23	10	9	12	6
Total United States	1,996	70	404	1,617	117	4,204	3,809	4,447	16,840,742	38,709	41,965	— 7.8	160,033,741	172,938,763	48	4	19	677	748	462	59	213	6,871	7,605	8,181	3,454	3,737	4,074
Total Western Canada	118	....	30	66	....	214	191	192	1,134,209	2,063	2,060	+ 0.1	11,202,675	10,285,330	....	....	....	....	....	....	....	....	....	....	....	157	158	202

* Gulf of Mexico wells are included in their respective district totals

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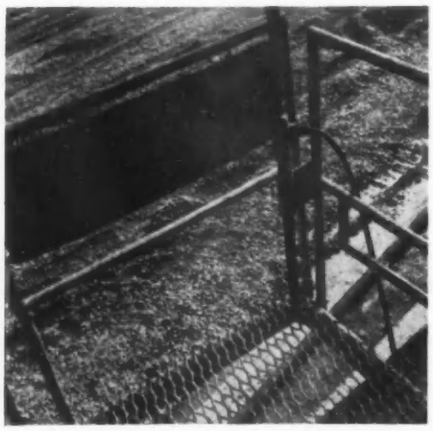
Practical Operating Hints

These How-To-Do-It Ideas Can Save You Money

Fire Hose on Barbed Wire Good Safety Precaution

On fenced installations where gates are not used, barbed wire may tear clothes or injure field personnel. This operator simply used two 36-inch lengths of old fire hose on the top and middle wire and solved the problem.



Utility Light Pole Holder Made From Scrap Pipe

Mounting utility light poles around the rig where they are needed to light the work and access areas and still be able to move them when moving the rig so that they will not be in the way or get damaged is sometimes a problem. One operator has handled this problem by welding a sleeve to a piece of metal that is then attached to the stair rail or any other fixture nearby to form a holding body for the light pole. A small metal sleeve or cup is then welded to the flooring for the bottom of the light pole to rest in. The pole can be inserted through the sleeve and into the cup by one roughneck when rigging-up. A junction box just above where the sleeve fits permits the electrical connection to be made when the lights are being strung and lighting is provided at a needed spot.

When tearing down, these lights are the first things removed. They are thus protected when all of the heavy work of moving is going on.

Chemical Lubricator Made From Used Casing

A simple chemical lubricator can be made from a 2-foot length of 7-inch casing welded at top and bottom. Two-inch nipples are welded into the end plates and the bottom plate is welded to a pipe saddle while the threaded nipple at the top is fitted with a hand-removable cap. A sight glass is installed on one side and equalizing lines are tapped into the flow line and connected as shown. Except for the sight glass and the small valves, all necessary parts can be found in the junk pile.

Modify Catwalk For Easier Pipe Handling

When rolling drill pipe and especially drill collars onto the catwalk from the pipe racks, it is often necessary to lift the pipe manually to wrap the catline around and under the pipe so that it can be hauled up onto the rig floor and placed in the mousehole. Some operators use a couple of loose boards placed crosswise on the catwalk, but this proves to be cumbersome and unsafe.

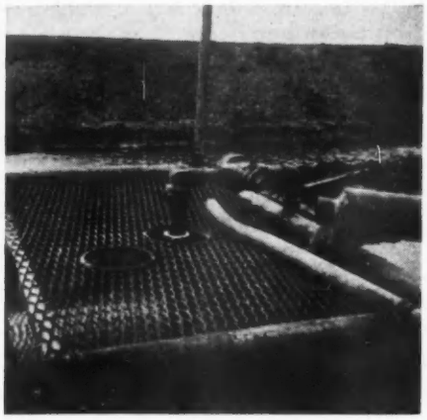
One operator used a 10-inch wide piece of channel iron to form the center section of his catwalk. However, to facilitate handling of the pipe and to make it easy to place a catline around the pipe while it was on the catwalk, the operator welded an inclined ramp near each end of the channel iron as shown in the photograph. This inclined ramp, at the apex of the incline, was on a level with the sides of the channel iron so that the pipe could be rolled on and off the center channel iron section without difficulty.

This proved to be an effective slide when laying down pipe so that the pipe could not get away and fall off the catwalk. Also, it was a big aid in bringing pipe into the derrick.

Carry Well Test Charts Beneath Car Dash Board

When the engineer or pumper is continually on the run, gas oil ratios, orifice meter charts often become lost, ruined or wrinkled if carried in the usual manner. One pumper solved this problem by installing a chart box beneath the dash board of his car. The compartment is made from a

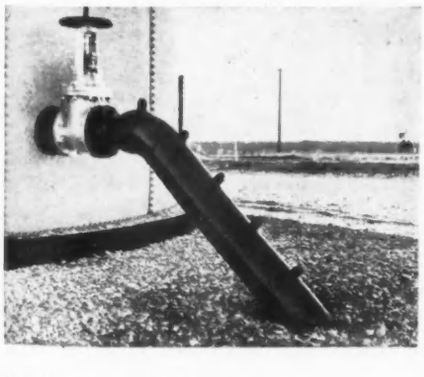
piece of galvanized metal. The front end of the box is bent upwards, perforated and bolted to the firewall partition behind the engine. The top edge of each side is flattened and equipped with holes which match holes drilled in the bottom of the dash. Stove bolts are used to secure the box.



Build Work Platform Over the Mud Pit

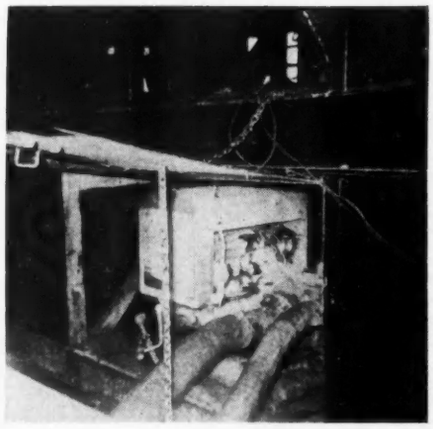
A platform made of "diamond configuration" mesh wire is used over one end of the mud pit. This enables the rig personnel to maneuver at one end of the mud tank when checking the mud or jetting the bottom of the pits.

Three sides of the platform are welded to the mud tanks while the fourth is welded to an angle iron support which runs from one side of the tank to the other.



Collars on Water Line End Taking Coupon Tests

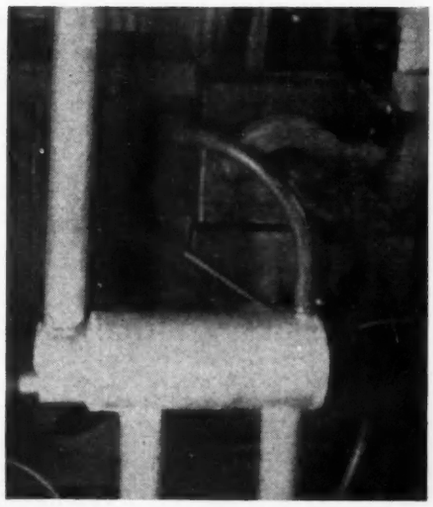
Installation of small diameter collars on the "treated" water line as indicated will solve the problem of taking coupon tests on waterflood injection water. When a coupon is to be installed, the tank valve is closed and a small plug in the collar is removed. The coupon then is inserted and made up in the collar.



Engine and Water Pump Unitized in Substructure

The pump and engine are permanently built into the substructure of the rig. When the rig is moved, the hoses are disconnected and the hinged cover is let down and fastened in place.

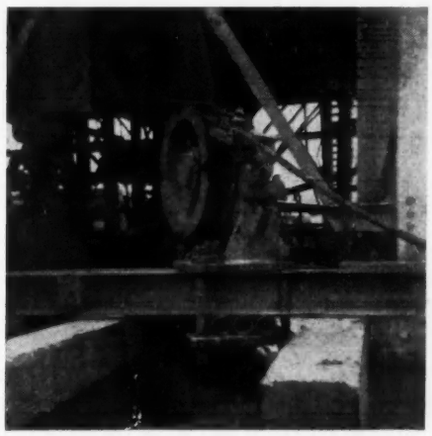
By permanently fixing this installation, the moving loads are reduced, thus decreasing the moving expenditure. The door is built of ¼-inch plate and is held open by chains fastened to the substructure. A solid base is constructed for the pump and engine.



Gas-Fired Motor Heater Built in the Field

This gas fired motor heater is constructed of one length each of 4 and 5½-inch pipe. The 4-inch pipe serves as the fire box. One end is closed with a baffle plate in the center within 1½-inches of the closed end. The upper half of the baffled end is closed and a three-inch length of 1½-inch pipe has been welded to receive the two-inch stack. The 5½-inch pipe serves as the water jacket.

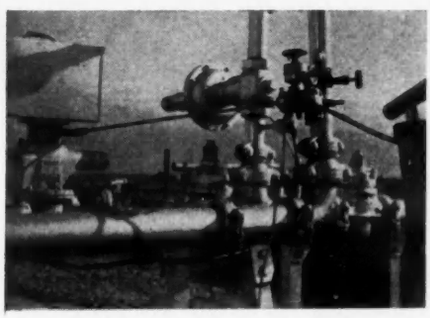
One end is closed and the fire box is centered, extended to within one-inch of the closed end and welded in place. Two ½-inch x 2-inch pipe nipples, one welded to the top of the water jacket and one to the bottom at opposite ends, are connected to the engine by ⅝-inch hose. The lower nipple should be connected at a lower radiator hose or block drain while the upper should be attached to the upper radiator hose engine head, away from the thermostat if possible. A pilot light from treater unit is adapted for the burner. Thirty minutes to one hour usually warms the engine enough for easy starting even in sub-zero weather.



Use Scrap Pipe As Spacers at Rig

Scrap pipe can always be used around a rig. Here is shown short pieces of pipe that were used to shear up under an I-beam whereby the threaded portion of the tie bolts was too long and spacers had to be used.

The pipe may be placed in the manner shown and when the tie bolts are tightened the drilling line reel is securely held in place.



Fluid Sampler Performance Improved on LACT Unit

The fluid sampler shown in the photograph previously was driven by a flexible cable from the meter to the sampler unit. The cable would often

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As an alternate to the torque record, a hydraulic system can be used to measure pump pressure, which provides an accurate reading on the actual pressure in the mud system, variations in pressure caused by equipment performance or changes in the mud system.

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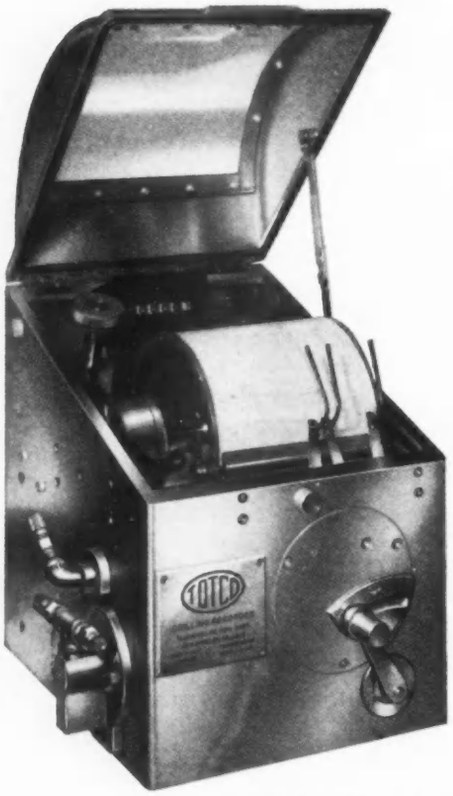

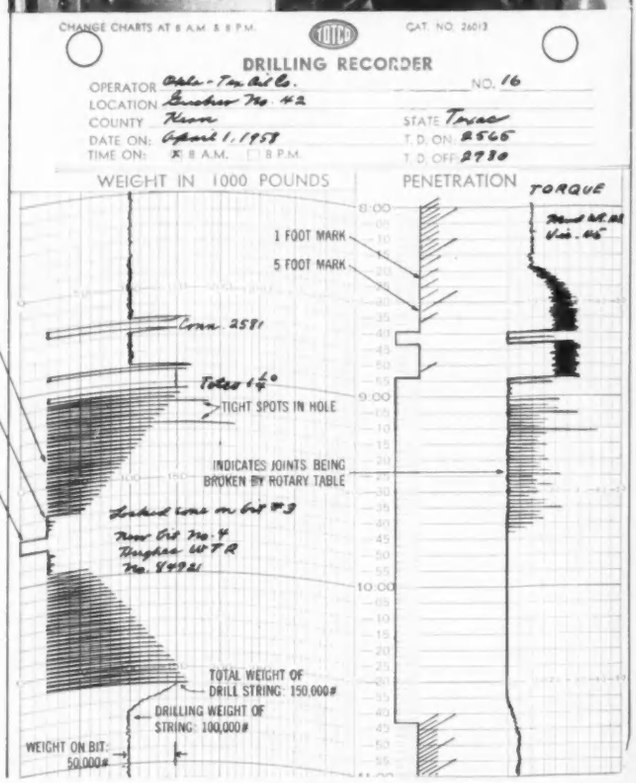

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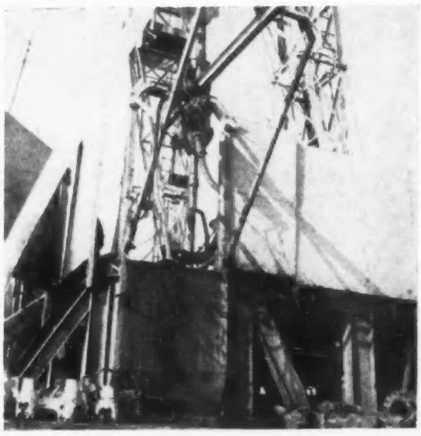
wrap up without turning the sampler until tension overcame the drag in the sampler unit. The whole cable then would unwind so rapidly that ports in the device were not exposed long enough to get a representative fluid sample. After this happened, the cable would start to rewind again.

The trouble was remedied with a field made drive shaft from ¼-inch steel rod with a universal joint from a ¼-inch socker set welded to each end. Total cost of the hook up was $4.29 for material plus welder's time. The shaft has been in operation for about 18 months without trouble.

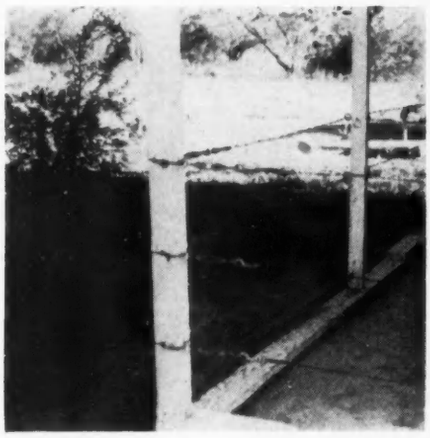


Electric Hoist Used to Bring Tools Onto Floor

An electric hoist mounted on a cantilevered rack will greatly facilitate bringing heavy drilling tools such as; bits, reamers, slips, etc., onto the drilling rig floor. This hoist made from lengths of pipe and an "I" beam can be removed with the aid of the catline when moving the rig and can be installed just as easily when rigging up.

Placed in the corner of the rig floor, it provides a direct lift for unloading drilling tools from trucks or a pick-up. A short ramp at tail-gate height provides a good loading and unloading area for the tools and they can then be hoisted onto the rig floor when needed. A metal crash plate is welded to the substructure to prevent tools from swinging in under the floor. The tools can be hoisted vertically. The hoist is run in on the rack and the tools lowered to the floor where they can be moved into position with the catline.

With this device there is no need for a roughneck to risk broken fingers by trying to hold the catline out from the rig while hoisting tools onto the floor.



Remove Fence Easily For Maintenance Repairs

Here is an excellent method for removing fences from producing equipment installations when maintenance is required. This operator uses a ¼-inch turnbuckle and snaps on each strand of wire. When removing the fence, the turnbuckle is loosened and the snap is disengaged. The wire then is shoved through the ¼-inch guides on the center supports and removed.

No-Wall-Stick Drill Collars

The surface area of these drill collars has been changed to reduce wall contact area by more than 40%. Weight loss of the drill collar is only about 4%. Reduction of 40% in contact area results in a proportionate decrease in the total sticking force due to differential pressure of 40%. This design also gives a section of pressure equalization each foot along the body of the drill collar.

Three sizes (6", 4¾", 4⅛") of NO-WALL-STICK DRILL COLLARS are available on a rental basis in the Texas and Louisiana Gulf Coast area. Rental price of these NO-WALL-STICK DRILL COLLARS is very competitive to conventional drill collars run with stabilizers.

Any new or used drill collars, regardless of size, owned by Drilling Contractors or Oil Companies may be converted to NO-WALL-STICK DRILL COLLARS for a fixed conversion charge.

NO-WALL-STICK DRILL COLLARS offer far more protection from wall sticking in high angle holes or holes which have shale wash outs than drill collar strings using stabilizers.

NO-WALL-STICK DRILL COLLARS will not ball up, will not peel off wall cake, and may be sealed off by a Hydril type blow out preventor at any point.

Patent Pending

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No-Wall-Stick Drill Collars
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This new drill collar design has been expressly developed to combat the problem of differential pressure sticking of the drill collar string in the hole. It is a direct step in materially reducing the total sticking force.

Please write Houston office for descriptive brochure and price schedules

No-Wall Stick Drill Collars may be handled through your local rental tool company

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New pipe configuration reduces wall sticking

By Fred K. Fox, President
Engineering Enterprises, Inc.
Houston

WHEN PIPE in the open hole is freely movable at any depth, the hydrostatic pressure of the drilling fluid is distributed uniformly over the entire surface area of the pipe. If this mud pressure is restricted and not uniformly distributed around the pipe by the wall of the bore hole and its mud cake, an unbalanced hydrostatic pressure condition exists. This results in the pipe being held against the wall of the hole by the differential or unequalized hydraulic pressure.

Wall-stuck pipe has been a common term for many years. It was evident early in the drilling industry that pipe in the open hole was less likely to become stuck if kept in motion. In areas where water is impractical and mud is required for drilling, it is imperative that all pipe in the hole be kept in motion, within practical limits, to prevent it from becoming wall-stuck. Direct physical hazards which can stick and hold the drilling string, thereby preventing its motion, include:

- Foreign objects.
- Incomplete removal of cuttings from the bore hole.
- Sloughing or heaving of the hole.
- Key seats.
- Balled-up bit or pipe.
- Wall sticking.
- Solidification of the fluid in the hole.

Pipe movement decreases wall sticking. When a high-solids drilling fluid is used and when a large difference exists between the hydrostatic pressure of the mud column in the bore hole and the formation pressure in a permeable section, field experience shows the pipe can become stuck if it is allowed to remain at rest for even a few seconds.

In the Gulf Coast area, more evidence supporting the theory of differential pressure sticking is that the free point of a string of stuck pipe is usually located just above a sand or permeable section of the hole. Seldom is this free point found to be in a large shale section. To free pipe by washing over, it is necessary for the wash-over shoe to actually drill out the sand section behind the pipe, thus allowing the hydrostatic pressure of the mud column to be equalized around the washed-over fish. Because of the force holding the fish against the side of the bore hole, (see Figure 1) it is impossible for the wash pipe to pull it off with a prying action. It is very common for this force to be in the range of 5,000 pounds to 15,000 pounds per foot of pipe stuck.

Sometimes stuck pipe can be freed by pumping oil, water or acid into the annular space opposite the porous section. This fluid acts to soften or destroy the mud cake which is effecting a seal on each side of the contact point of the pipe and the bore hole wall. Spotting of fluid is only successful when it has altered the sealing wall cake to the point that it is no longer a pressure barrier and the full hydrostatic pressure is allowed to act upon the entire external surface of the pipe.

The fluid also is generally of a lower density than the drilling mud, and this factor aids in freeing the pipe by decreasing the differential pressure per unit area acting across the pipe. Many strings of stuck pipe have been freed by intentionally reducing the density of the entire mud column, thereby lowering the differential force acting across the stuck pipe. This method is

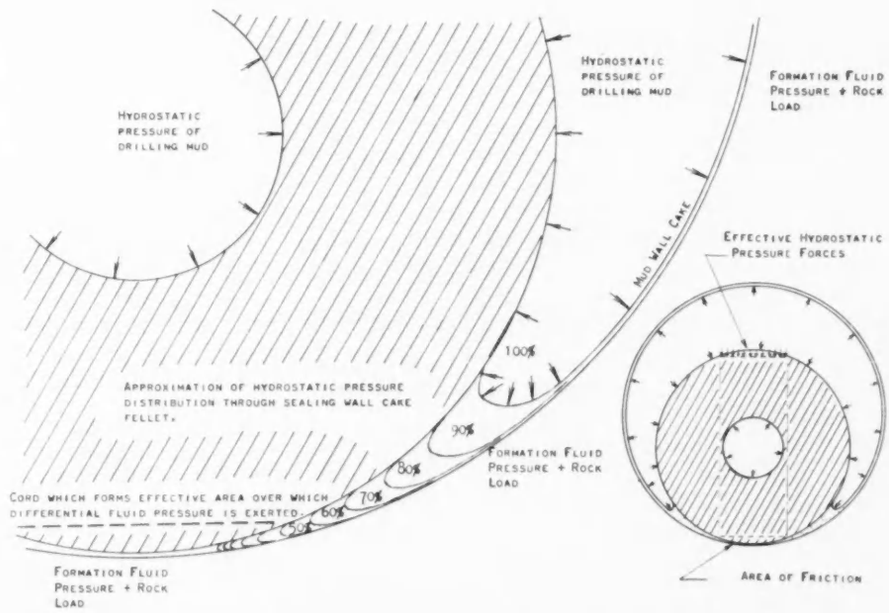
HYDROSTATIC PRESSURE OF DRILLING MUD
HYDROSTATIC PRESSURE OF DRILLING MUD
FORMATION FLUID PRESSURE + ROCK LOAD
MUD WALL CAKE
EFFECTIVE HYDROSTATIC PRESSURE FORCES
100%
90%
80%
70%
60%
APPROXIMATION OF HYDROSTATIC PRESSURE DISTRIBUTION THROUGH SEALING WALL CAKE FELLET.
CORD WHICH FORMS EFFECTIVE AREA OVER WHICH DIFFERENTIAL FLUID PRESSURE IS EXERTED.
FORMATION FLUID PRESSURE + ROCK LOAD
FORMATION FLUID PRESSURE + ROCK LOAD
AREA OF FRICTION

FIGURE 1—Force distribution around wall stuck pipe.

only valid in a well being drilled with too high a mud weight at the time the pipe was stuck. Differential pressure sticking is not a problem where wells are drilled with air, gas or clear water.

Many operators and contractors believe pipe cannot be stuck by differential pressure in normal pressure or shallow drilling. This is not true. It is true, though, that per 1,000 feet of hole drilled, the percentage of fishing jobs which occur in normal pressure drilling is far less than on wells which require dense drilling muds. This is due mainly to four factors:

- Small difference in the hydrostatic mud pressure and the reservoir pressures of the sand sections open to the well bore.
- The increased effective pull of the pipe at the bottom of the hole because of the low weight of the drilling string at the shallow depth.
- The low percentage of solids in a well-maintained mud.
- The large difference between the circumference of the inside of the drilled hole and the outside circumference of the drill pipe. (This difference is not usually maintained when drilling deep below protection casing because of jet bit fluid horsepower requirements.)

Conversely, several factors tend to increase wall sticking in shallow, fast drilling, but they do not normally outweigh those mentioned above.

- High-water-loss drilling fluid which builds a thick mud cake.
- High percentage of sand present in the drilling fluid when a de-sander is not used on the mud system.
- Large contact area between the large diameter drill collars used and the thick sand sections generally found in drilling the upper zone of a well.

Differential pressure sticking in areas of abnormal pressure is second only to blowouts as an economic hazard. Areas of abnormal pressure are those areas where the bottom hole pressure gradient changes as the depth changes. It is in these areas that blowouts and differential pressure sticking are common. Both of these dangers exist when the maximum bottom hole pressure of any permeable reservoir cannot be approximated by multiplying the depth of the reservoir by 0.465, the pressure gradient of salt water.

In the Louisiana Gulf Coast area of abnormal pressure, the normal gradient commonly will exist down to a specific depth; then it will begin to increase to a maximum of approximately 0.9 pounds per foot of depth. The bottom hole pressure of a sand with such a pressure gradient would require 17.4 ppg drilling mud theoretically, and in practice may require 18 ppg drilling fluid to enable the drilling crews to carry out their normal drilling operations. It has been found that, in some areas, once this maximum gradient has been reached, the numerical value of the pressure gradient may begin to decrease. This decreasing gradient has been known to drop back to as low as 0.78 pounds per foot of depth.

Unless the depth at which protection casing is set and properly cemented is selected in accordance with the pressure gradient curve existing in the area being drilled, extreme problems in lost circulation, inadequate mud weight, and differential pressure sticking will exist.

Since differential pressure sticking can be progressive, it is important that the proper steps be taken in the first few seconds after the pipe becomes wall stuck. Laboratory data show that when regular round pipe becomes wall stuck the pipe may be moved vertically (parallel to the sealing fillets of the drilling mud) for short distances without breaking the

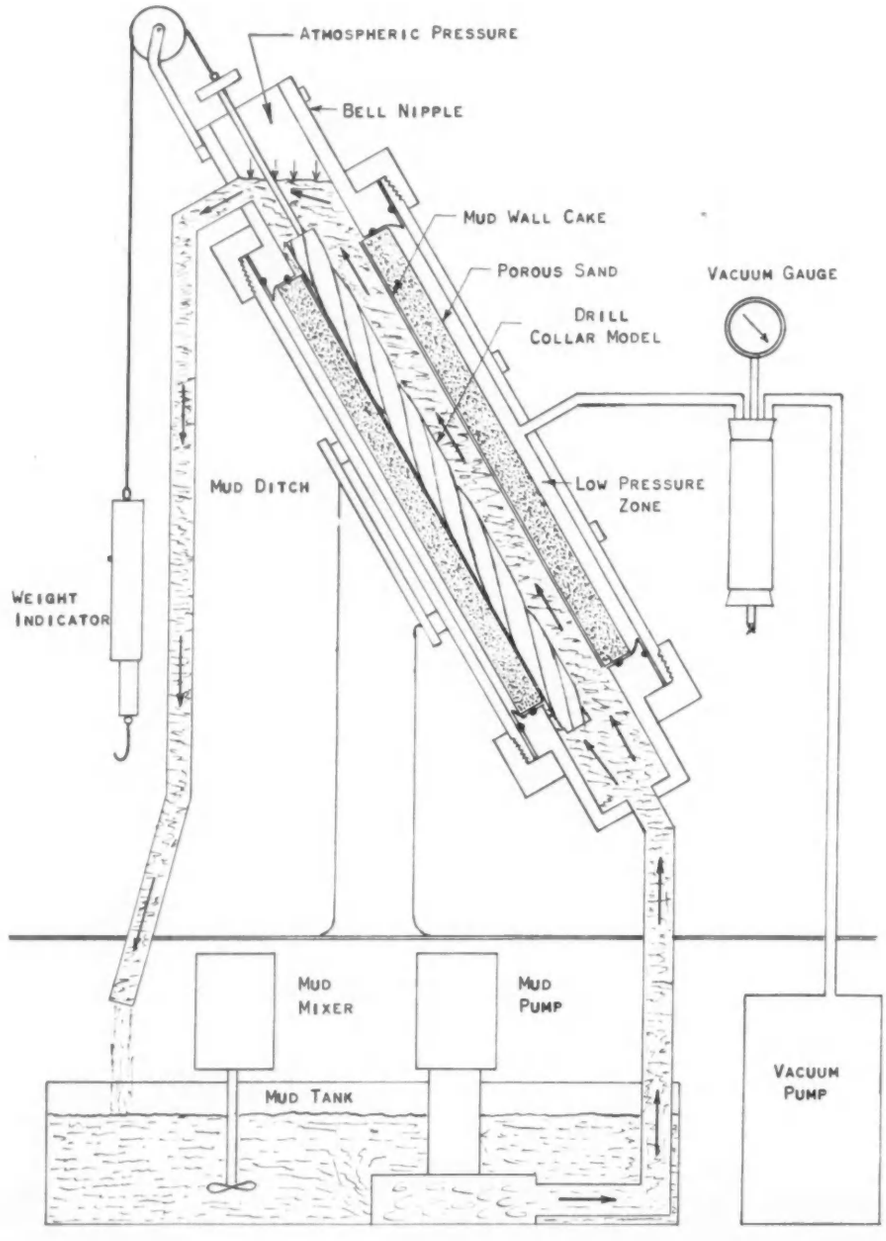

FIGURE 2—This device was used to demonstrate and test differential pressure.

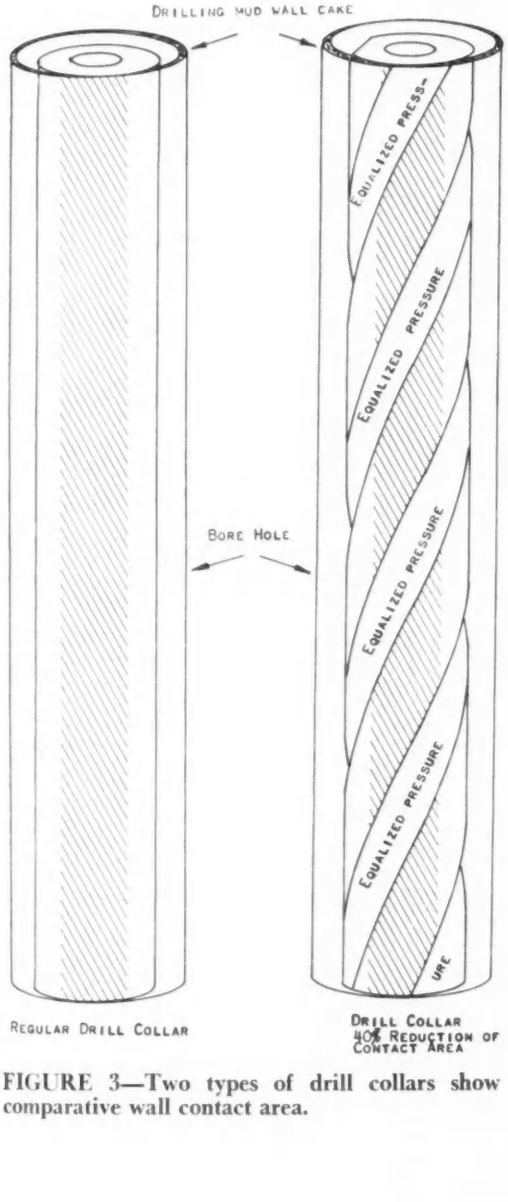

FIGURE 3—Two types of drill collars show comparative wall contact area.

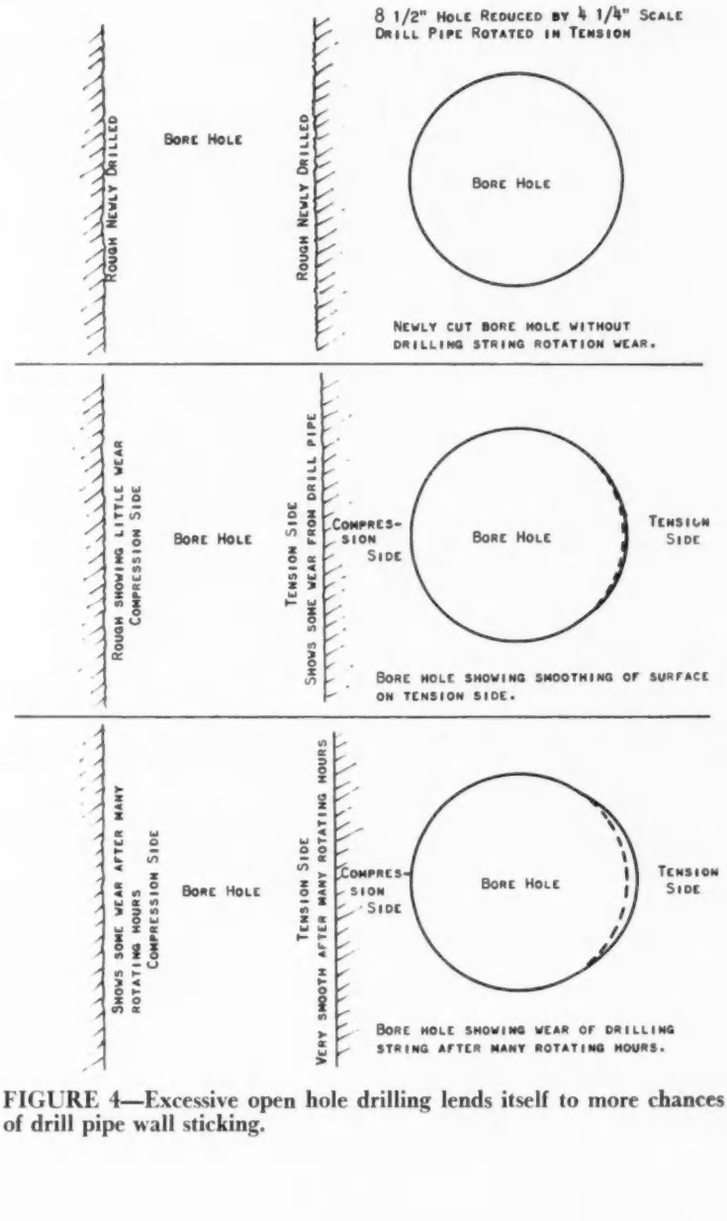
8 1/2" HOLE REDUCED BY 4 1/4" SCALE
DRILL PIPE ROTATED IN TENSION
ROUGH NEWLY DRILLED
BORE HOLE
ROUGH NEWLY DRILLED
BORE HOLE
NEWLY CUT BORE HOLE WITHOUT DRILLING STRING ROTATION WEAR.
ROUGH SHOWING LITTLE WEAR
COMPRESSION SIDE
BORE HOLE
TENSION SIDE
SHOWS SOME WEAR FROM DRILL PIPE
COMPRESSION SIDE
BORE HOLE
TENSION SIDE
BORE HOLE SHOWING SMOOTHING OF SURFACE ON TENSION SIDE.
SHOWS SOME WEAR AFTER MANY ROTATING HOURS
COMPRESSION SIDE
BORE HOLE
TENSION SIDE
VERY SMOOTH AFTER MANY ROTATING HOURS
COMPRESSION SIDE
BORE HOLE
TENSION SIDE
BORE HOLE SHOWING WEAR OF DRILLING STRING AFTER MANY ROTATING HOURS.

FIGURE 4—Excessive open hole drilling lends itself to more chances of drill pipe wall sticking.

pressure seal of the wall cake. This would indicate that, in practice, the best chance to free the stuck pipe lies in rotating it, which model studies show (see Figure 2). Rotation of stuck pipe will break the mud seal. It is essential that the driller know this so he, in the first few seconds, may try to work the maximum torque into the pipe at the bottom of the hole. Also, the free pipe above the initial stuck point is less likely to become stuck if the drill pipe is kept in compression in the open hole.

External flush tool joint drill pipe sometimes used in deep drilling operations is more likely to become wall stuck than drill pipe which has external upset tool joints. This is because of the hole centering effect of the external upset tool joint. Such is not the case with the external flush drill pipe, which allows the full length of the drill pipe joint to make uniform contact with the bore wall (see Figure 3).

One of the most important elements in the prevention of differential pressure sticking, which can be controlled by the drilling personnel, is the condition of the drilling fluid. A drilling fluid which should be most suitable and in which the drilling string will be the least likely to become wall stuck should have the following general properties:

- A density which will only exert the minimum safe differential pressure against any permeable section open to the bore hole.
- The lowest practicable percentage of solids in the drilling fluid.
- The drilling mud wall cake on permeable sections of the hole should be as thin and impermeable as possible, yet retaining a semi-plastic state allowing it to effectively transmit pressure. Thus, an ineffective pressure seal along the contact boundaries of the pipe and the bore hole results.

Drilling muds which are in an inverted emulsion of water in oil or a single phase oil with dispersed solids to control fluid density are effective in developing a thin, impermeable, yet pressure-transmitting wall cake. Laboratory tests with these types of muds show a greater reduction in pull-out force than in a conventional mud system under the same conditions of differential pressure. Field observations of wells which have been drilled with oil phase fluids substantiate the laboratory test results. Some of the presently available mud additives for conventional water base

FIGURE 5—Here are modified drill collars used to minimize differential sticking.

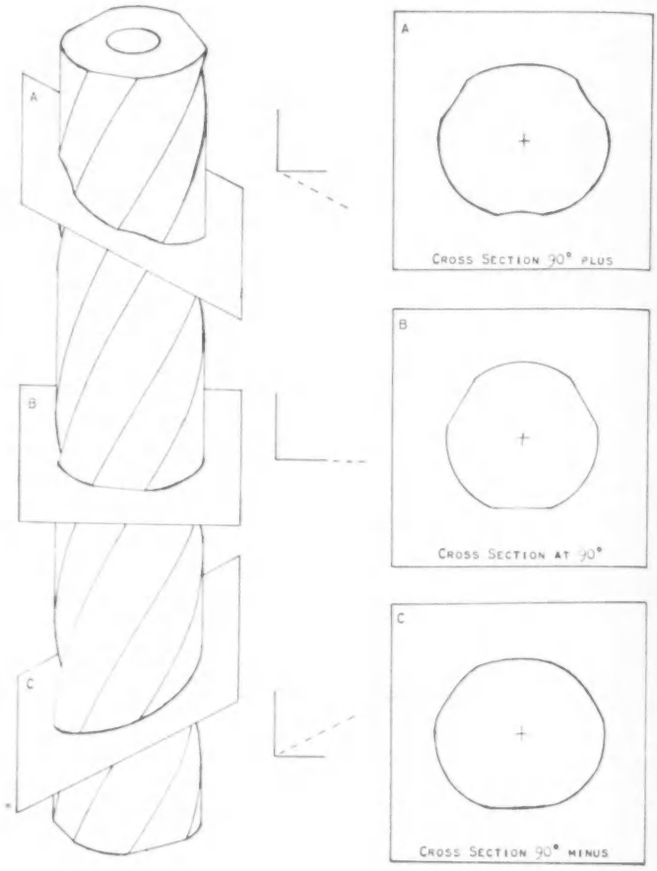

FIGURE 6—The drill collar surface area contact varies with the axis of rotation.

muds, which have been tested along with the models, are satisfactory.

The reason for the increase in stuck pipe after a large number of rotating hours in the open hole is generally attributed to differential pressure sticking. Considering some of the factors necessary to effect a good seal of the mud cake and to increase the chances of becoming wall stuck, the regularity of the surface of the bore hole must be taken into account. (See Figure 4.)

All laboratory work has been done with permeable cylinders which have a constant diameter bore and in which the inside surface of the bore hole is of uniform smoothness. If these conditions existed in a drilling well, it would be improbable that any deep well would be completed without several fishing jobs. New holes which have just been drilled should have a bore hole surface which has many small irregularities. These irregularities should be more evident in the firm sand section which generally stays to bit gage and resists the washing action of the drilling fluid. These irregularities may vary from $\frac{1}{64}$ inch to $\frac{1}{8}$ inch from the theoretical surface of the well bore.

So long as the rough surface of the bore hole is in contact with the drilling string an ideal contact area for differential pressure sticking is not present. As drill pipe is allowed to rotate for a long period of time against this sand face, the slight roughness left on the sand face by the bit is worn down. This results in a smoother surface, and any drill pipe, collars or casing stopped opposite this part of the hole may become wall stuck. Therefore, a well which is drilled with a minimum of rotations of the drilling string in open hole will be a safer well to operate in, if all other conditions are equal.

Centralizers-stabilizers reduce well sticking. For many years, centralizers have been used on casing strings primarily to insure a uniform distribution of cement around the pipe. Recently, the use of centralizers has greatly increased. They were found effective in aiding the successful running of casing or liner strings.

Where centralizers are used to prevent wall sticking of the casing string, it is essential that they be placed close enough together to effectively reduce the contact area of the casing and the bore hole. The smaller the casing, the closer the hole clearance and the higher the angle of the bore hole, the less effect each centralizer will have and the closer together they must be spaced.

The same consideration must be taken into account with stabilizers in the drill collar string when they are used to reduce wall sticking. In large-diameter, straight holes where stiff, large-diameter drill collars can be used, stabilizers are effective if formations are firm enough to hold up to bit gage and if the hole does not tend to wash out or stabilizers do not tend to bury themselves. Under these conditions, a stabilizer run on each stand of the collar string can be effective. As the diameter of the hole is decreased and drill collar diameters

are proportionately decreased, the wall contact area will increase unless the distance between stabilizers also is decreased.

Field data have shown that in a small diameter 6-inch hole, using 4⅛-inch drill collars, it would be necessary for the stabilizer spacing to be reduced to less than 30 feet to be as effective as 90 feet spacing where 6¾-inch diameter drill collars are used in a 9 ⅞-inch hole. High angle holes will decrease the effectiveness of the stabilizers in both cases. In drilling areas where shale sections are known, enlarged hole diameter above and below sand sections can nullify the advantages of using stabilizers.

Change drill string basic design. A new method by which differential pressure sticking can be reduced is by a modification of the basic design of the drilling string. During the past year, over 100 deep, high mud-weight wells have been successfully drilled with this type of equipment. At the present, only drill collars have been modified and used in the field. The theory behind this modified design of drill collar is that if the contact surface of the collars is broken repeatedly and at short intervals down the body of the drill collar, then regardless of its position in the hole the hydrostatic pressure of the mud column will be equalized around a large percentage of the drill collar's length.

By doing this, the total sticking force due to differential pressure is reduced proportionally. This type of drill collar is built by spiraling several grooves down the length of the collar (See Figure 5). Grooves are so designed that in the place of rotation a cross-section of the drill collar would not have any concave surfaces. (See Figure 6.) This type of groove retards balling-up of the collar yet retains stability with only a slight decrease in weight. This approach to differential pressure sticking should become more widely used as wells are drilled deeper and drilling costs increase. It reduces the total sticking force and is independent of the condition of the bore hole wall as to washouts and hole angle.

Wall-stuck pipe generally can be defined as pipe that became stuck while it was at rest against the side of the bore hole, that full and unrestricted circulation is possible in the annular area and that the stuck pipe may not be moved up, down or rotated. When fishing for wall-stuck, pipe it is essential that the hydrostatic pressure of the mud exerted against the surface of the open hole be reduced to the safe minimum so that only the lowest differential pressure practical will exist at any permeable section of the hole. If this is done, then it would be unsafe to pump low density oils, water or acids into the annular area opposite the free point of the pipe. An oil phase fluid which has a density equivalent to the drilling mud in the hole can be used.

In general, these oil phase fluids have been more successful in freeing stuck pipe primarily because of the relatively high viscosity which, when allowed to soak into the sealing mud cake under a pressure differential, results in a mud seal which can no longer isolate the low pressure side of the stuck pipe.

Time is a major factor when spotting weighted oils around a stuck fish because of the mechanics of the action described above. After the weighted oil has been pumped to the free point, as much as 16 to 20 hours may be required for the oil to effectively soften the wall cake. During this time, it is good practice to back off from the fish as soon as the oil is spotted and to pull the free pipe out of the hole. A set of jars run below 6 to 12 drill collars can be added to the string and run back in the hole, tying into the top of the fish with an overshot.

If the free point is at the top of the collar, all free drill pipe should be removed from the top of the fish so that there will be no limber pipe between the fish and the jars to soften the blow to the jars. Jar action is effective where the stuck drill collars have stabilizers closely spaced in the string or if the modified type of collar had been stuck. A conventional type of collar without closely spaced centering stabilizers is difficult to jar free under conditions of differential pressure because jar action imparted to the stuck fish results in small vertical movements which are not generally effective in breaking the sealing mud fillets.

This type of fishing operation generally will require less than two days rig time. If this first step is unsuccessful, it is necessary for the operator to evaluate immediately the cost of redrilling the lost portion of the hole as compared with an attempt to wash over and recover the lost hole and fish. When the free point is located in the drill pipe just above a sand, it is often possible to free the pipe in the sand by washing over; and, in addition, to recover many feet of free pipe below the depth reached by the washover shoe. Washing over drill pipe generally is much safer if external upset wash pipe can be used.

A washover operation on stuck drill collars is hazardous in a deep hole. Clearances are small and contact areas are large. Milling over stabilizer blades also increases the danger. If all pipe is freed down to the top of the collars by washing over, it would be advisable to attempt to jar the collars free, even though they may have been at rest in the hole for several weeks. This has been done successfully on each occasion that a full string of modified drill collar was left in the hole below stuck drill pipe.

The main fact to remember in discussions of differential pressure sticking problems or drilling problems is that the bore hole diameter is extremely small when compared to the bore hole length (1/10,000 and smaller), and the steel pipe in the hole has the over-all physical properties of only a fine wire. —**The End**

About the Author

Fred K. Fox was first employed by Halliburton Oil Well Cementing Company in 1942. He graduated from the University of Texas in 1949 with an BS and MS degree in petroleum engineering. Upon graduation, he returned to employment with Halliburton as a trainee engineer. He later was employed by Associated Engineers, Inc., and the New Ulm Corporation. In 1954 he began operating as a consulting engineer specializing in drilling and completion problems of the Gulf Coast. In the latter part of this year, Mr. Fox organized Engineering Enterprises, Inc., of which he is now president.

How to determine permeability from well log data

Simple method proves valuable in evaluating producing potential of a well and in reservoir work when core information is lacking

By Jarl P. Johnson
Division Engineer
Kewanee Oil Company
Odessa, Texas

KEWANEE OIL COMPANY has found a simple permeability interpretation technique based on information from well logs to be of valuable assistance when core data are lacking. Logs used are those commonly employed in salt mud systems, and include focused microdevices (microlaterolog or F_oR_{xo}), an independent porosity measuring technique (velocity or neutron) and a means for measuring R_t (laterolog or guard). This article discusses the method as applied to the San Andres formation of West Texas.

When the microlaterolog was first introduced, it was explained that it was a device for measuring the resistivity of the flushed zone around the well bore (R_{xo}), and that the following relationship between R_{xo}, R_{mf}, porosity and residual oil saturation in the flushed zone (ROS) exists:

$$\phi = \sqrt[2.15]{\frac{0.62\ R_{mf}}{\frac{R_{xo}}{(1\text{-ROS})^2}}} \qquad (1)$$

$$\text{Where } F = \frac{0.62}{\phi^{2.15}}$$

and

$$\phi = \frac{\sqrt{\frac{R_{mf}}{R_{xo}}}}{1\text{-ROS}} \qquad (2)$$

$$\text{Where } F = \frac{1}{\phi^2}$$

These equations are based on the familiar Archie's formula:

$$S_w = \sqrt[n]{\frac{F\,R_w}{R_t}}$$

Their application assumes that the microdevice is measuring R_{xo} and that all the connate water has been displaced by mud filtrate. In salt mud systems where the resistivity of the mud filtrate is similar to the resistivity of the formation water, the second assumption is relatively unimportant. A plot of Equation 2 with values of ROS from 0 to 90 percent is shown in Figure 1.

Since no direct method was given for determining ROS, an estimated value is used to compute porosity from data obtained from the microdevices.

It is often difficult to estimate residual oil saturation in the highly stratified carbonate rocks of West Texas with sufficient accuracy to allow use of these tools for porosity evaluation. Not only does the ROS vary through the producing zones, but its indicated value is much higher in the low permeability zones than the actual ROS is generally considered to be.

If an accurate porosity value can be obtained from the sonic or neutron log and R_{xo} is available from one of the microdevices, a value for ROS can be computed from Equation 1 or Equation 2, depending upon the formation factor applicable. Unfortunately, accurate values of porosity and R_{xo} are not always obtainable in stratified rocks because of variations in the petrophysical characteristics of the rocks as affected by variations in pore geometry and the limitations of logging devices in detecting these conditions.

The complex problem of computing an actual value for ROS has prompted use of an apparent ROS factor for the purpose of this discussion. The apparent ROS factor also may be considered as a correction factor for equating R_{xo}/R_{mf} to F, the formation factor. This factor can be obtained from Figure 1.

PERMEABILITY DETERMINATION

In an oil reservoir, the degree of flushing of the R_{xo} zone (and the residual oil saturation in the zone) by the mud filtrate is largely dependent upon permeability of the reservoir rock. It is expected that as permeability decreases, the amount of residual oil remaining in the R_{xo} zone increases. This trend continues in a water wet reservoir until the permeability values become small, then saturations will be small due to the effect of capillarity. However, the apparent ROS factor, as determined from Figure 1, may continue to increase.

This phenomenon usually occurs in resistive multiple porosity type rocks and can be considered to be the result of the limited response of the microdevices to porosity which is not associated with permeability. For example, in a zone with small non-interconnected vugs and perhaps some intergranular porosity, the microdevice will detect only the conditions in the intergranular porosity while the neutron or sonic log will be measuring total porosity. Thus, a calculation from Figure 1 would indicate a high ROS even though the vugs may be completely filled with water.

The apparent ROS in this instance may be considered to be related to the tortuosity of the rock and should, therefore, be correctly indicative of the permeability conditions.

The solid line in Figure 2 is a curve resulting from a plot of the apparent ROS versus permeability for a limited

number of data points from the San Andres formation in West Texas. The apparent ROS values were determined from Figure 1 using R_{xo} values from the microlaterolog and porosity values from whole core analyses. The permeability values are averages of the maximum and 90° air permeabilities recorded in the core analysis report.

Conformance of the data to the curve in Figure 2 is good between permeability ranges from 50 md to 0.3 md and ranges of ROS_a from 0.10 to 0.80 where the connate water saturation is less than 25 percent and where permeable zones are of sufficient thickness to allow proper resolution of the logs.

Effect of connate water saturation. The preceding relationship applies only to zones of relatively low connate water saturation. Obviously, in a predominately water filled zone, residual oil saturation will be low regardless of permeability. In fact, near the oil-water contact, zones of low permeability can be expected to have low residual oil saturations due to capillary forces.

Zones of high water saturation usually can be detected by calculating the water saturation using Archie's formula and data from the laterolog or guard log. However, permeability conditions in these zones are not important to the evaluation of a well's productivity as they are usually water productive.

Although conformance is not good, the dotted line in Figure 2 represents an average curve for water saturations greater than 25 percent. No trend was noted for variations in water saturation where values were low, because of the effect of the petrophysical characteristics of the rock on these values.

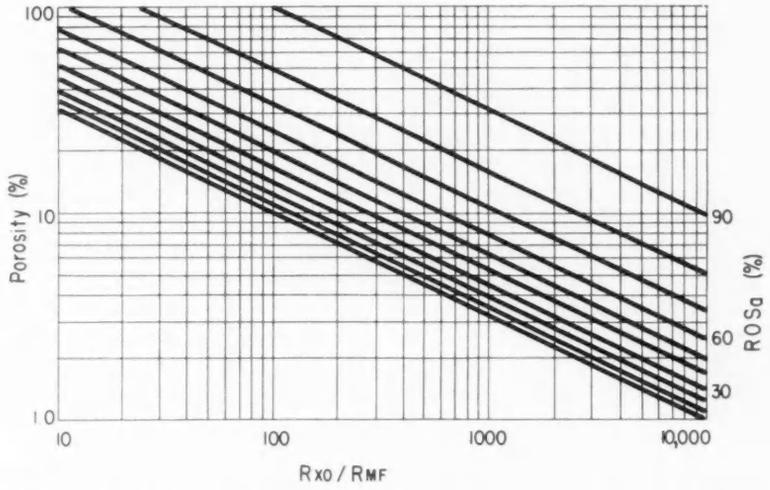

FIGURE 1—Apparent residual oil saturation factors may be determined from this chart and used to compute ϕ from the microdevices. Also, this ROS_a factor may be considered a correction for equating R_{xo} / R_{mf} to the formation factor.

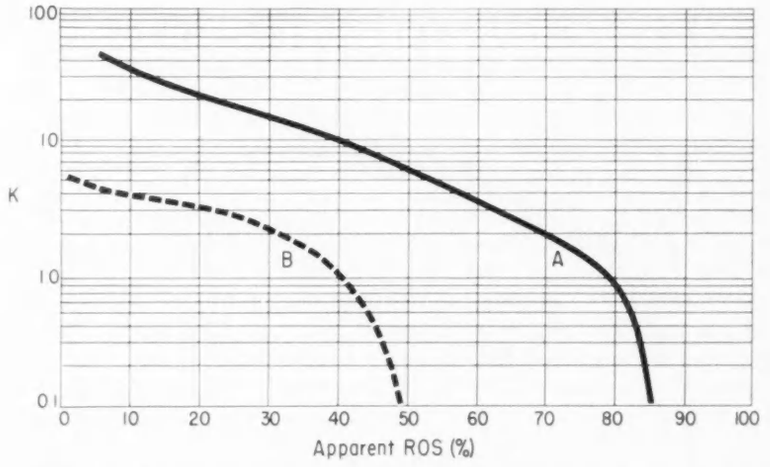

FIGURE 2—Relationship between permeability and apparent residual oil saturation. Curve A is a plot of ROS_a and K for the San Andres formation of West Texas. ROS_a values were obtained from Figure 1 using R_{xo} values from the microlaterolog and porosity values from whole core analyses. Also, connate water saturation was less than 25 percent. Curve B is an average for water saturations greater than 25 percent.

APPLICATION

This technique can be illustrated through use of examples representing three types of wells:

1. Well which produced with high oil rate and low water rate after fracturing.

2. Well which produced water from one zone after stimulation and produced small amounts of oil and water from another zone after fracturing.

3. Well which produced 100 percent water without stimulation.

Example 1. After fracturing, this well flowed at the rate of 36.6 boph with no water. Interval 7 (Table 1) is of particular interest in that a ROS_a of 0 percent is indicated. This value may be indicative of two reservoir conditions: a fracture or large vug which is completely flushed or a thin zone which did not allow complete resolution of the porosity measuring device. Either condition would also be responsible for the high water saturation value indicated. There is reason to believe that such values of ROS_a may also hint of poor water-oil relative permeability conditions in the particular zone.

Example 2. Data from this well are shown in Table 2. Zones in the well were divided into four groups, and group C was the first tested. As expected from calculated water saturation and permeability, this group produced 100 percent water after an acid treatment of 3,000 gallons. The dotted curve in Figure 2 was used to estimate K for this group.

Group A then was tested. This group produced no fluid prior to stimulation and produced a total of 1,329 barrels of oil and approximately 7,000 barrels of water in 15 months following a fracture treatment. Field experience has shown that significant production rarely is obtained from zones where some permeability is not indicated by this method, even though these zones are subsequently fractured.

Due to operational difficulties and the marginal possibilities of Group B, it was not tested. This group probably would have produced some oil with a water-cut after fracturing, but would

not have justified the cost of recompletion.

Example 3. This well (Table 3) was classified as a wildcat. Calculations of connate water saturations indicated that the well would possibly produce oil with a large water-cut. Good permeabilities were indicated from the well log data. The well tested at a rate of nine bwph without a trace of oil. As mentioned before values of ROS_a of the order indicated here may be significant in predicting the behavior of the well with regard to the water-oil ratio.

Other considerations. There are factors other than those discussed which should be considered in making an evaluation of this type. One is the effect of very thin permeability developments or fractures in non-conductive rocks on values read from the logs. The microdevices will have a tendency to investigate deeper than the R_{xo} zone reading R_i or perhaps R_t. At the same time, the porosity measuring devices will average the porosity over the zone. Fortunately, the two conditions tend to offset each other in their effect on calculations in an oil zone and will accent the presence of water in a water zone.

As is true in other quantitative uses of well log data, the importance of obtaining an accurate porosity measurement cannot be over-emphasized. Not only is this the most important measurement to be made, but perhaps the most difficult. Velocity type logs seem to be the best approach to this problem in the San Andres formation at the present time.

Since the curves used in this discussion are empirical in nature and derived from data obtained from the San Andres formation in West Texas, they should be verified by a larger study before their application is extended to other formations.

This article was taken from a paper presented to the First Annual Meeting of the Society of Professional Well Log Analysts in Tulsa, 1960.

TABLE 1—Well Data for Example 1

Interval		R_w = .058				R_{mf} = .031					
		R_a	R_t	S_w	θ	θh	R_{xo}	$\frac{R_{xo}}{R_{mf}}$	ROS	K	Kh
No.	Ft.										
1	5	75	125	24.0	9	45	17	550	52	5.8	29.0
2	4	70	115	14.4	15	60	11	356	65	2.9	11.6
3	10	70	115	18.8	12	120	11	356	52	5.8	58.0
4	4	115	192	17.7	10	40	18	580	59	4.0	16.0
5	3	25	40.4	20.0	19	57	6	195	62	3.5	10.5
6	4	70	115	20.5	11	44	10	325	50	6.4	25.6
7	2	18	29.4	55.5	8	16	4	129	0	50.0	100.0
8	8	40	66.2	21.2	14	112	7	226	51	5.8	46.4
9	2	60	99.6	24.2	10	20	21	680	62	3.5	7.0
10	4	40	66.2	29.7	10	40	21	680	62	3.5	14.0
11	8	70	116	28.0	8	64	18	580	50	6.4	51.2
12	4	70	116	22.4	10	40	25	810	65	2.9	11.6
Total	58					658					380.9

Average θ = 11.3 Percent.
Average K = 6.6 md.
Average S_w = 23.1 percent.
On potential after fracture well flowed 100.66 barrels of oil and no water in 2 hrs. 45 mins. through 28/64 inch choke.

TABLE 2—Well Data for Example 2

Interval		R_w = 0.092				R_{mf} = 0.036					
		R_a	R_t	S_w	θ	θh	R_{xo}	$\frac{R_{xo}}{R_{mf}}$	ROS	K	Kh
No.	Ft.										
1	6	125	210	50.0	4.2	25.2	>50	....	..	.1*	.6
2	3	175	286	43.2	4.2	12.6	>50			.1	.3
3	2	500	828	24.8	4.3	8.6	45	1250	32	2.0	4.0
A. 4	4	333	550	31.0	4.2	16.8	>50	....	..	.1*	.4
5	4	333	550	29.2	4.5	18.0	>50			.1*	.4
6	4	90	148	49.0	5.0	20.0	38	1050	48	.7	2.8
7	4	100	165	23.7	10.5	42.0	35	975	70	2.1	8.4
8	3	100	165	23.7	10.5	31.5	25	695	61	3.7	11.1
9	6	90	148	23.8	10.5	63.0	27	750	65	2.8	16.8
B.10	4	55	92	32.0	10.5	42.0	15	417	52	.4	1.6
11	6	55	92	42.4	7.5	45.0	18	500	40	1.2	7.2
12	3	42	70	30.3	12.0	36.0	10	278	50	.5	1.5
13	3	30	50	43.0	10.0	30.0	12	333	46	.7	2.1
14	4	19	32	55.0	9.8	39.2	6	167	20	3.0	12.0
C.15	4	39	65	38.4	9.8	39.2	14	389	48	.5	2.0
16	4	10	16.7	71.0	10.5	42.0	3	83	0	5.0*	20.0
17	6	11	18.4	59.0	12.0	72.0	4	111	20	3.0	18.0
D.18	6	15	25.1	52.6	11.5	69.0	6	167	30	2.3	13.8
Total	76					652.1					123.0

Average θ = 8.6 Average K = 1.6 md. Average S_w = 41.5 percent.
* Estimated.

TABLE 3—Well Data for Example 3

Interval		R_w = 0.06				R_{mf} = .04			
		R_a	R_t	S_w	θ	R_{xo}	$\frac{R_{xo}}{R_{mf}}$	ROS	K
No.	Ft.								
1	2	28	46.2	36.1	10	8	200	30	2
2	3	28	46.0	36.2	10	14½	580	60	.2
3	6	10	16.7	50.0	12	2	50	0	*
4	8	12	20.0	52.1	10½	3	75	0	*
5	4	20	33.3	29.4	14½	3	75	20	3
6	10	6	10.0	48.4	16	1½	38	0	*
7	4	8	13.3	46.4	14½	2	50	0	*

* While these zones cannot be assigned a permeability value, it is clear that the permeability is sufficiently high to produce fluid.

ACKNOWLEDGMENT

The author wishes to thank Mr. D. E. Hockaday for his helpful suggestions in preparation of this article.

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About the Author

Jarl P. Johnson was graduated from the University of Tulsa in 1953 with a B.S. degree in petroleum engineering. He was employed by Phillips Petroleum Company upon graduation and joined Kewanee Oil Company in 1955 as a junior engineer at Crane, Texas. He was later promoted to senior engineer and district engineer at Crane and was transferred to the West Texas Division office in Odessa in 1957. He now is division engineer at Odessa. He is a member of Society of Petroleum Engineers.

In southeast New Mexico . . .

Abo reef play yielding large oil fields

Identification of fore- and back-reef facies is key to delineation of elongate reef fields

By William J. Le May, Geologist
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THE ABO IS A TRANSGRESSIVE BARRIER REEF which separated lagoonal deposits on the northwest shelf from clastic deposits in the Delaware Basin during lower Leonard (Permian) time. The reef probably grew on a pre-existing platform or hingeline along the rim of the Delaware Basin. The reef grew northward, transgressing the shelf deposits, as well as vertically in the lower Leonard (Abo) section.

Three distinct lithologies, indicative of three different environments of deposition, were the result of the Abo reefing: 1. basin deposits (Bone Spring formation or fore-reef deposits); 2. reef, and 3. shelf deposits, Abo formation, or back-reef deposits.

Trend development. The Abo reef was first found to be oil-productive when Skelly Oil Co. deepened a well beneath shallow San Andres production in Lovington field in December 1951. The Abo reef was topped at 8,117 feet and flowed oil on a drill stem test. During the early development of the Lovington Abo field, the rapid facies changes mentioned above were noted traversing the reef *from south to north.*

It was not until the discovery of Empire Abo field by Pan American Petroleum Corp. and Hondo Oil and Gas Co. in November 1957, and the early development of this field that the Abo reef became a major exploration target. Pay thicknesses in excess of 600 feet were encountered at depths from 5,500 to 5,800 feet. Rapid development followed.

The reef trend was delineated rimming the Delaware Basin by a litho-

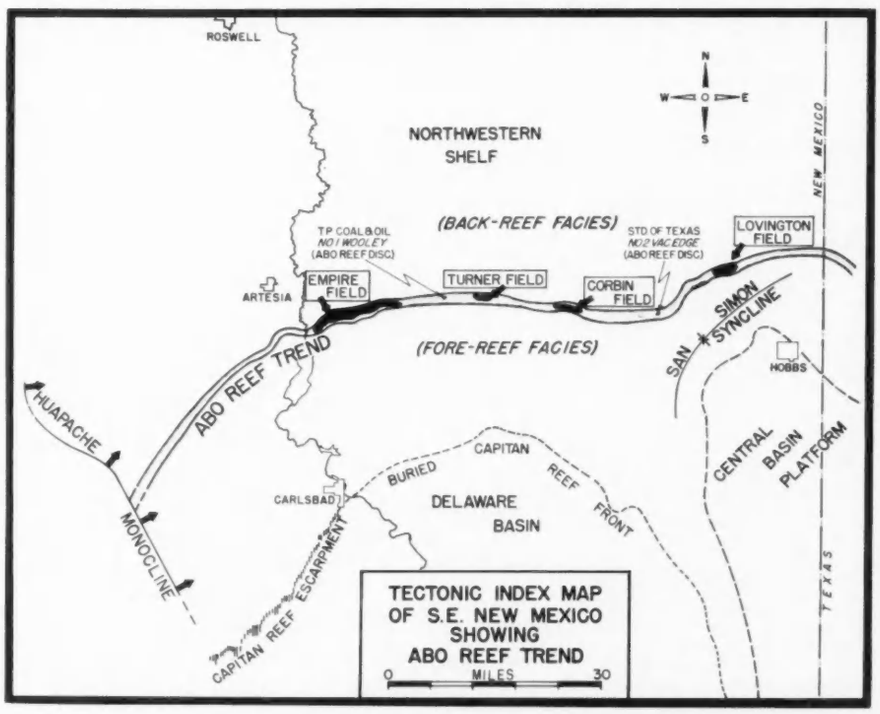

FIGURE 1—Abo reef trend has been established by oil production scattered over a length of at least 60 miles in Eddy and Lea counties, New Mexico from Empire through Lovington fields. Recent discoveries by Texas Pacific Coal and Oil Co. between Empire and Turner Abo fields and by Standard Oil Co. of Texas between Corbin and Lovington provide closer regional control. Abo trend may extend eastward into Gaines and/or Yoakum counties, Texas, and as far west in New Mexico as the Huapache monocline. Although only water has been found in the Abo west of Empire field, Abo prospects may be more favorable toward the extreme west than indicated here.

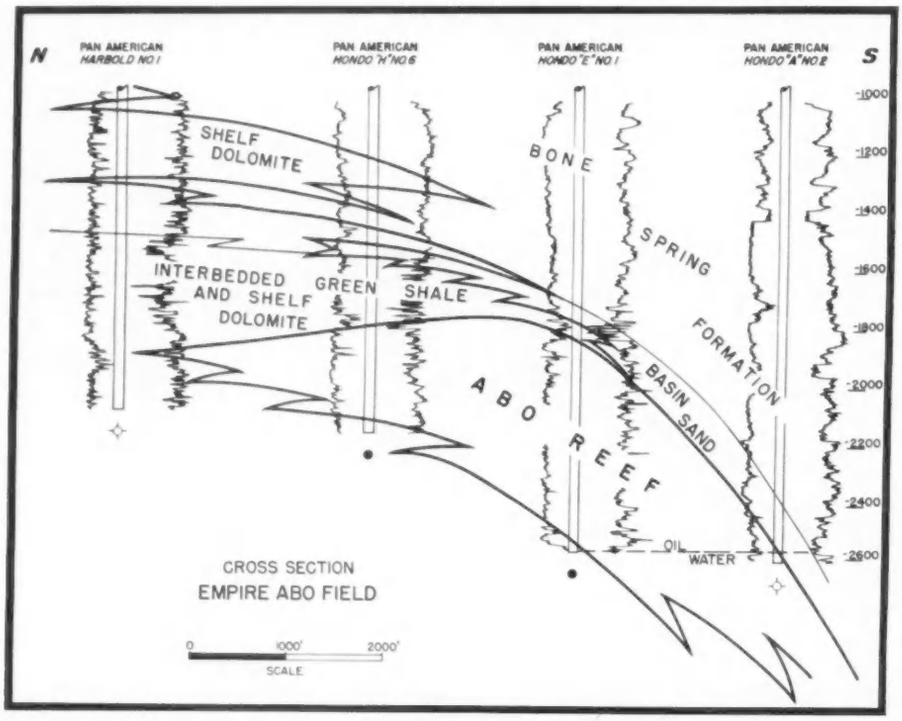

FIGURE 2—Dip cross-section shows Abo reef buildup. Evident are (1) about 700 feet of gross reef pay thickness in best well shown; (2) difficulty in correlating logs via electrical log characteristics alone; (3) distinctive fore-reef and back-reef facies; and (4) steeper fore-reef than back-reef slope.

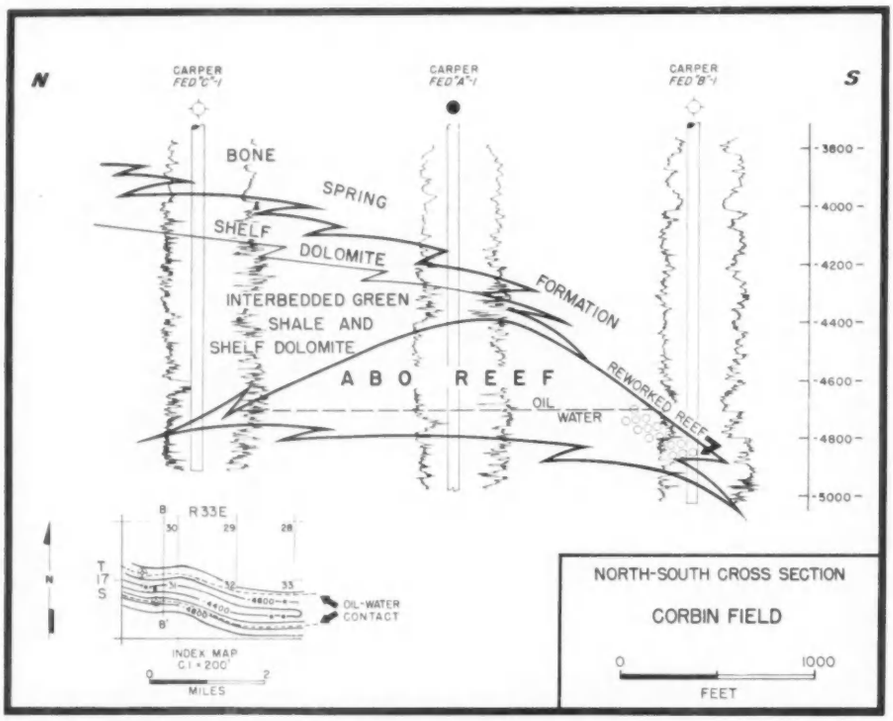

FIGURE 3—Dip cross-section across Corbin Abo reef field shows more nearly equal fore-reef and back-reef slopes. Note that *scales of Figures 2 and 3 are different.* **as opposed to vertical, reef growth.**

logic study of samples in the lower Leonard section. This caused accelerated acreage acquisition along the reef trend from the Texas line westward across Lea and Eddy counties to the "Huapache structure" in western Eddy County. The degree of well density in various areas governed the width of the reef trend. Strong wildcatting activity along the trend began, continuing at a very rapid pace to the present.

Since December 1959, there have been four Abo reef discoveries between the Empire and Lovington Abo reef fields; Corbin Abo, Turner Abo (or Cedar Lake Abo as it has recently been classified), Wooley Abo and Vac Edge Abo. The last two fields mentioned have not been officially named. The lease names of the discovery wells have been used to identify them here.

Empire and Lovington Abo fields have separate water tables. All fields are in their early stages of development.

STRATIGRAPHY

Northward, behind the reef, evaporites and lagoonal sediments were being deposited in a restricted environment. These are back-reef shelf deposits consisting of interbedded green shales and light gray to tan, fine crystalline, anhydritic dolomites. These sediments grade northward into red shales. This shelf deposit has been called "Abo formation." Sedimentation on the fore-reef side consists of black to dark brown, argillaceous and cherty dolomites and limestones interbedded with fine-grained sandstones. These sediments have been called "Bone Spring formation."

The Abo reef is a very clean, white to light tan and gray (commonly anhydritic) dolomite, varying from dense micro- and finely crystalline to coarsely crystalline in texture. The original reef framework probably consisted predominantly of hydro-corals, sponges and algae colonies. Occasional brachipods, gastropods, and pelecypods have been noted in cores.

The Abo reef is unique in the noticeable absence of fossil remains. Probably in the dolomitization and recrystallization process much of the original fossil assemblages were destroyed. Anhydrite is quite common as a secondary deposit. Anhydrite inclusions a few inches to a few feet in diameter occupy many of the reef fractures and vugs. These inclusions predominate near the base of the reef.

Reef development and diagenesis. Certain conditions concerning reef growth and development can be postulated from observed subsurface stratigraphic relationships. Figures 2 and 3 show cross-sections through the

reef in the Empire and Corbin areas. Certain observations are very significant:

- In the Corbin area, basin sediments extend farther back-reef than at Empire
- The reef at Empire is larger, both vertically and horizontally than at Corbin (note difference in scales in Figures 2 and 3)
- The back-reef slope of the Empire reef is more gentle than at Corbin
- Both fore-reef slopes are steep.

The reef crest at Corbin is 2,600 feet deeper than at Empire field.

In visualizing the reef growth pattern, it is apparent that variations occur along strike. In such areas as Corbin, reef growth approaches a vertical profile. In other areas, e.g., Empire, growth approaches a horizontal plane. The direction and rate of reef growth were apparently controlled by the rate of subsidence. A stable or slowly rising sea level offers favorable conditions for horizontal reef growth. A more rapidly rising sea level (or subsiding land) results in vertical growth of the reef. There are all graduations of the growth profile between vertical and horizontal. Where the sea level rises too rapidly, reef growth is stopped (Figure 4).

The importance of these variations along strike can not be stressed too heavily. The size and shape of Abo reef fields are dependent upon the growth profile of the reef and its variations in transgression. It has been noted that *basin* sediments are more transgressive in the Corbin area than at Empire. A structure map will reveal steeper dip on shallow formations in the Corbin area. These relationships reveal a condition of relatively localized subsidence in the Corbin area. This subsidence probably stopped further reef growth (Figure 4). It is reasonable to assume that this (accelerating) subsidence existed during the latter stages of reef building, producing the vertical type profile of reef growth.

RESERVOIR CHARACTERISTICS

The Abo reef is a good reservoir because of well-developed secondary porosity. Vertical fractures were developed in the reef matrix, possibly due either to post-depositional tilting of the reef in early Tertiary or to compaction of the original reef framework due to overburden.

These fractures acted as channelways for solution activity. The original limestone was dolomitized and recrystallized. Vugs were created, especially at the intersection of fractures. This fracture and vug porosity system offers the only effective means of communication within the reef.

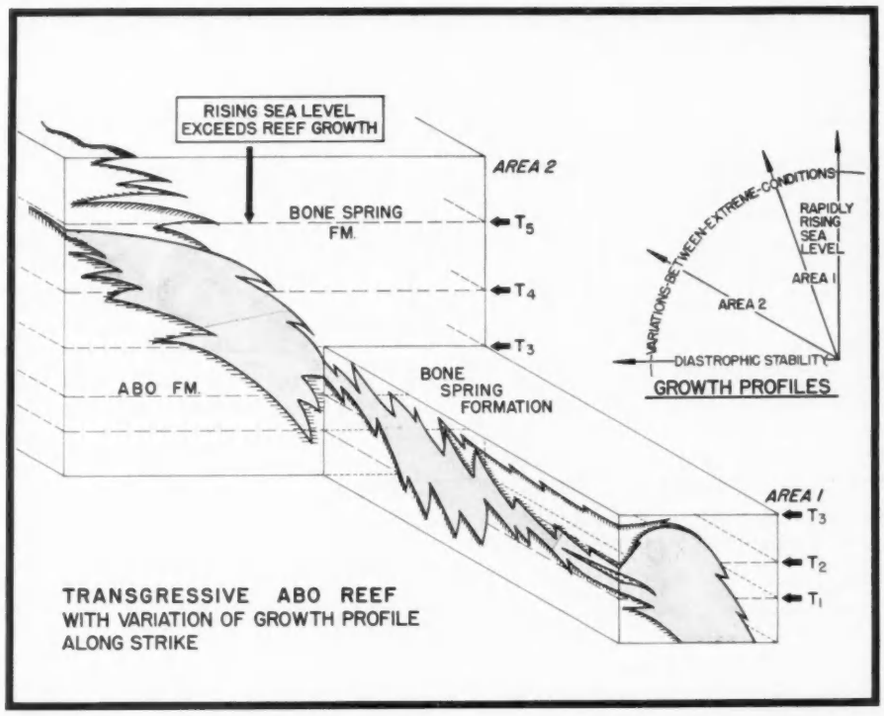

FIGURE 4—Stable or slowly rising sea level encourages horizontal growth of reef. A more rapidly rising sea level causes vertical growth, but if the rise is too fast, reef-building organisms are killed off and reef growth ceases.

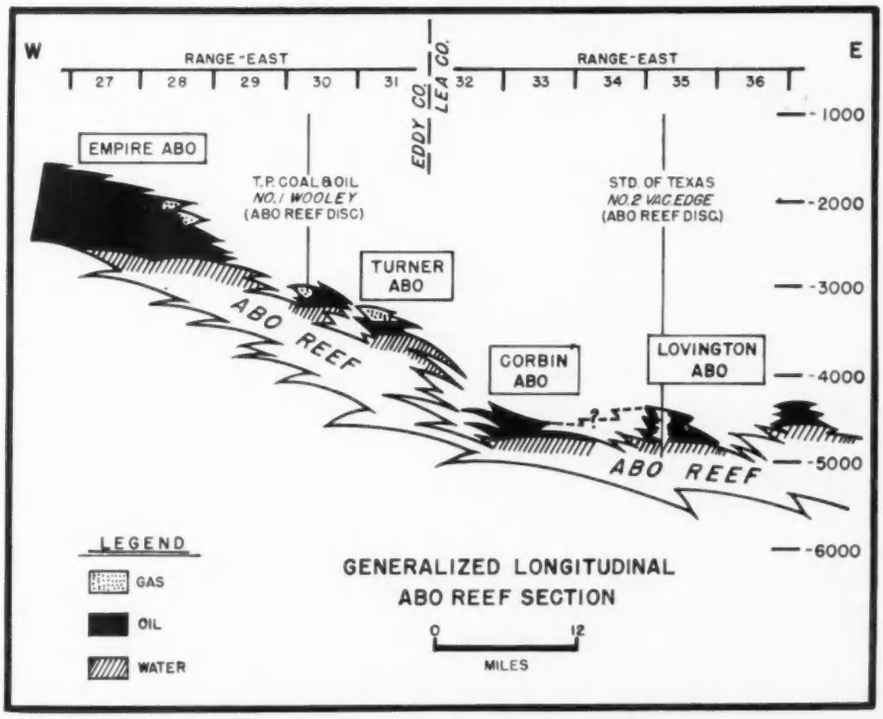

FIGURE 5—This schematic diagram shows general relationship of Abo oil fields to each other and to the main reef. Larger reef fields are those of greater lateral, as opposed to vertical, reef growth.

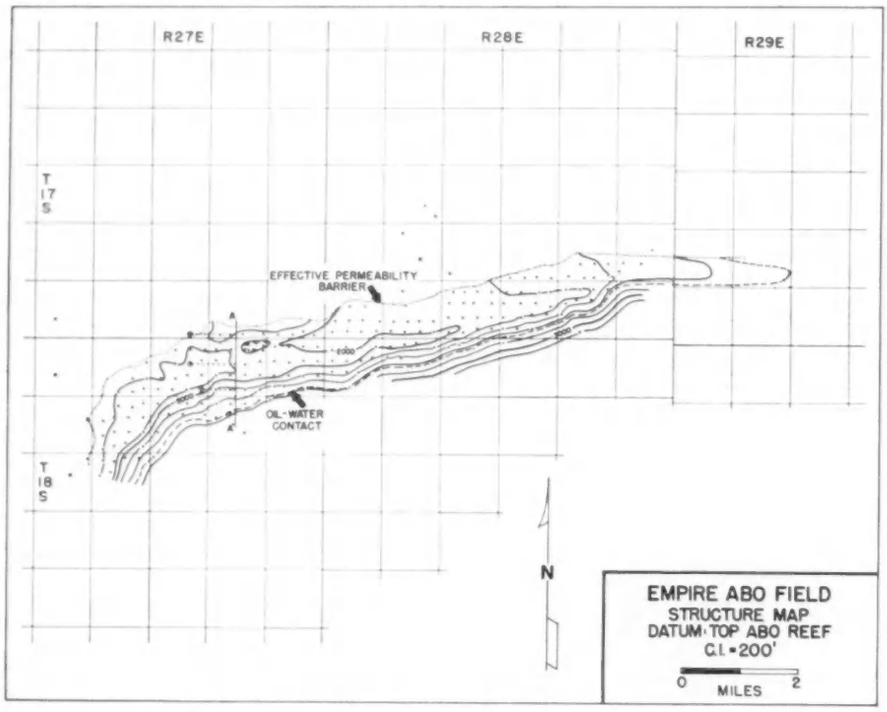

FIGURE 6—Structure on top of Abo reef, Empire field. Steep fore-reef slope is again shown by close contours despite large (200-foot) contour interval.

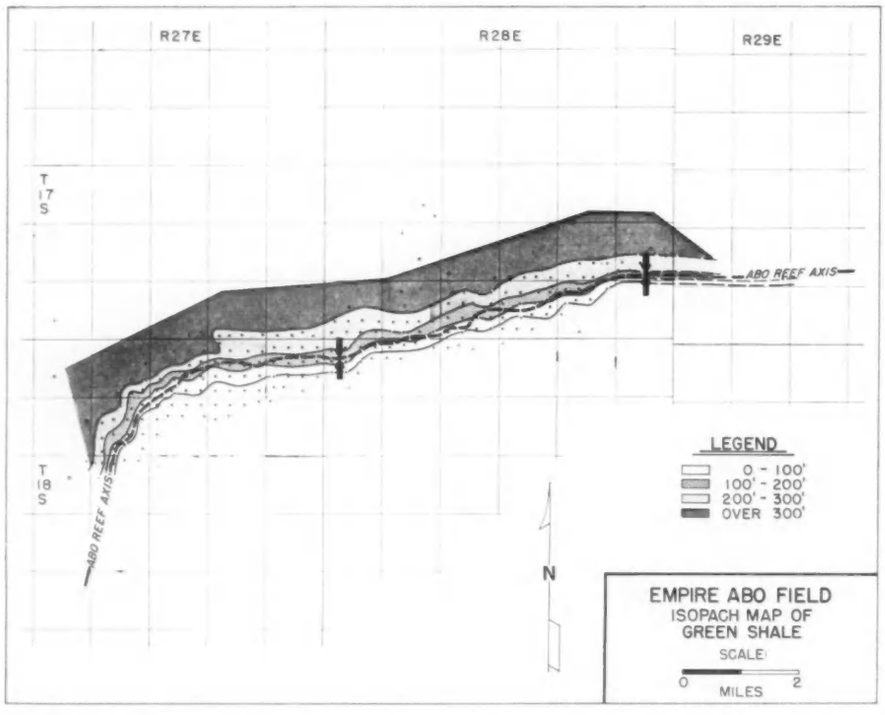

FIGURE 7—Isopach values of green shale section overlying Abo reef in Empire area are almost parallel to the reef axis.

Porosity is distributed irregularly within the reef reservoir. Not even offset wells can be correlated in the reef because of this irregular porosity development. Communication in local areas is very poor. This is evidenced by gas trapped in some low structural areas in Empire field. In the west end of Empire there are pockets of abnormally high water. In many cases in which a well has been completed in an anomalously-high water zone, the water cut diminishes and oil production increases after the water has been drawn off. Most of these wells have to be pumped, again reflecting locally poor reservoir communication. In many areas, low porosities and permeabilities can be attributed to excessive anhydrite deposition. This condition is prevalent in the western end of Empire Abo field.

The nature of the reservoir drive mechanism in all reef fields but Lovington is questionable. Water drive is active in Lovington Abo field. Production history bears this out.

Reserves. Empire Abo field is estimated to contain more than 65 million barrels of recoverable oil. It is likely that fields of equal magnitude may be discovered in this trend in the future.

Reserves figures calculated for the Empire Abo field vary from 300,000 barrels to 1,000,000 barrels per location. A rough approximation for all reef fields might be 500,000 barrels per location. These figures vary with pay thickness, quality of reef pay, and the nature of reservoir drive.

The Abo reef presents a very attractive drilling prospect when one considers the high reserves which can be found at moderate depths. There are some wells in the Empire Abo field with over 600 feet of pay at a depth of 5,600 feet. The Empire Abo field averages approximately 300 feet of pay. Depth to the reef in the Corbin and Lovington areas vary between 8,000 and 8,500 feet. In western Eddy County, the Abo reef is topped between 4,000 feet and 4,500 feet.

ABO REEF TREND EXPLORATION

Hydrocarbons have been trapped where porosity exists in relatively high structural areas along the reef. Figure 5 shows general relationships of Abo oil fields to each other and to the main reef. Three dimensions are needed to visualize the various factors contributing to hydrocarbon entrapment. Fore-reef productive limits are defined by each field's water table. Oil production will be limited back-reef either by the reef reservoir dipping under the field water table (e.g., Corbin Abo field) or, the reef reservoir interfingering with dense shelf dolomites, forming an effective permeability barrier (Empire and Lovington fields). The latter condition usually occurs where the reef has transgressed northward and its slope is gentle back of the crest.

Larger reef fields are of this type because the width of the field has

been increased by lateral reef growth. Figure 6 shows structure on top of the reef in the Empire area. The productive area is five to seven locations wide. In contrast, the width of production in the Corbin area (Figure 3) is from one to three locations wide.

In the only completely defined field (Lovington Abo) the east-west productive limits are defined by the reef reservoir dipping under the water level. This type of trap condition seems to be present in other fields along the Abo reef trend. A gentle eastward plunge appears to be carrying the reef under water in the eastern end of the Empire Abo field. Certain evidence points to a different condition in operation in the western extremity of the Empire field:

- Reef lithology in the west end of Empire is slightly different than that farther eastward. The dolomite is less porous and permeable, and more finely crystalline. Its color is darker gray. Anhydrite has filled more of the fractures and vugs

- In contrast to other Abo reef fields, the oil column at Empire occupies approximately 70 percent by volume of the total reef reservoir. In other fields, this figure approaches 20 percent.

- Along the Abo reef trend west of the Empire field, the reef is encountered higher in the section. Thus far only water has been encountered in the reef. This evidence points to some type of permeability barrier near the western end of the Empire field development.

The first step in any Abo reef exploration program is to delineate the transition zone between lower Leonard basin and shelf facies. This involves a lithologic study of well samples across the general reef trend. Wells which contain 100 percent shelf or 100 percent basin lower Leonard sections present no problem. It is only where interfingering of the two facies occur that a more detailed study of the area is needed.

Since the Bone Spring formation transgresses the Abo reef in certain areas, it is important to estimate the approximate position of reefing in the section. It can be noted on Figures 2 and 3 that a section of interbedded green shale and shelf dolomite lies directly behind and slightly over the crest of the reef. The top of the green shale constitutes a lithologic top and can be correlated on sample and electric logs. Since the Abo reef acted as a barrier, the top of the green shale and shelf dolomite should be time-equivalent to the top of the reef. Structure maps on top of the green shale, isopach maps of the green shale section, and cross-sections are useful in exploring for and exploiting Abo reef fields.

Figure 7 is an isopach map of the green shale section overlying the Abo reef in the Empire area. Note that there is a thin section of green shale overlying the reef axis or crest. This is probably the result of Tertiary tilt.

In wildcatting for oil-productive Abo reef, one well is usually not sufficient to test an acreage block adequately. Where a well encounters Bone Spring formation immediately overlying water-bearing Abo reef, an excellent prospect lies to the north or back-reef of that well. Where only a shelf section is penetrated in the lower Leonard series, one would move south or fore-reef for the next location.

The reef is capped by a section of green shale 10 to 50 feet thick along its crest. Therefore, water-bearing reef capped by the above thickness of green shale would discourage further exploration except along the reef strike.

Possible new areas. Experience with Abo reefing along the Artesia-Lovington trend in southeastern New Mexico has led to speculation in other areas where similar back-reef—fore-reef conditions exist. Abo reefing has been postulated along the western hingeline of the Central Basin Platform in New Mexico and the Platform's eastern hingeline in Texas. There are strong indications of Abo reefing along the "Huapache structure" in western Eddy County, New Mexico. Barrier reefs of other ages should be examined in light of the success encountered with the Abo reef.

CONCLUSIONS

1. The Abo reef is a transgressive barrier reef which separated shelf deposits of the Abo formation from basin deposits of the Bone Spring formation.

2. Variations in the size and shape of the reef along its strike can be attributed to a growth profile which was controlled locally by subsidence.

3. Porosity development of the reef is secondary, resulting possibly from Tertiary tilting or compaction due to overburden, fracturing, and solution activity. Subsequent anhydrite deposition has destroyed much of the secondary porosity development.

4. Hydrocarbons are trapped where secondary porosity development has created a reservoir in relatively high structural areas along the reef.

5. Exploration procedure involves a lithologic study of stratigraphic relationships in the lower Leonard section. The upper section of interbedded green shale and shelf dolomite is considered reef equivalent and should be mapped and isopached. A thin section of green shale overlies the crest of the reef, probably a result of Tertiary tilt.

This article is based on a paper presented at the third annual Southwestern Federation of Geological Societies meeting, Abilene, Texas, October 12-14, 1960.

About the Author

William J. Le May has been a geologist with Hondo Oil and Gas Company, Roswell, N. M., since June 1959. He graduated from Carleton College, Northfield, Minn., in 1955, and received his M.S. degree in geology from the University of Michigan in 1956. From 1956 to 1959, he worked for Pan American Petroleum Corporation in the Roswell and Lubbock districts.

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Nitrogen can improve your production practices

Advantages include better results from stimulation treatments, precise well control on completion

By Ray A. Plummer, Assistant Manager and Chief Engineer
A. W. Smith, Manager, Nitrogen Oil Well Service Company, Houston

USE OF NITROGEN GAS in drilling and producing operations has increased appreciably during the past year. Introduction of large, insulated vacuum type vessels for transporting liquid nitrogen to location has increased versatility of the operation—single units now can provvide gas volumes of 175,000 scf at pressures to 10,000 psi at the wellhead.

To date, chief use of the gas has been as a displacement medium for wells on completion. Also, corrosion inhibitors, surfactants and paraffin solvents have been successfully displaced into wells using nitrogen as a carrying medium. Additional applications include:

1. Perforating. Tubing is displaced with gas under pressure. Well can be perforated through tubing without danger of blowing gun up the hole.

FIGURE 1—Liquid nitrogen unit can deliver a maximum of 175 Mcf gas at pressures to 10,000 psi to the wellhead.

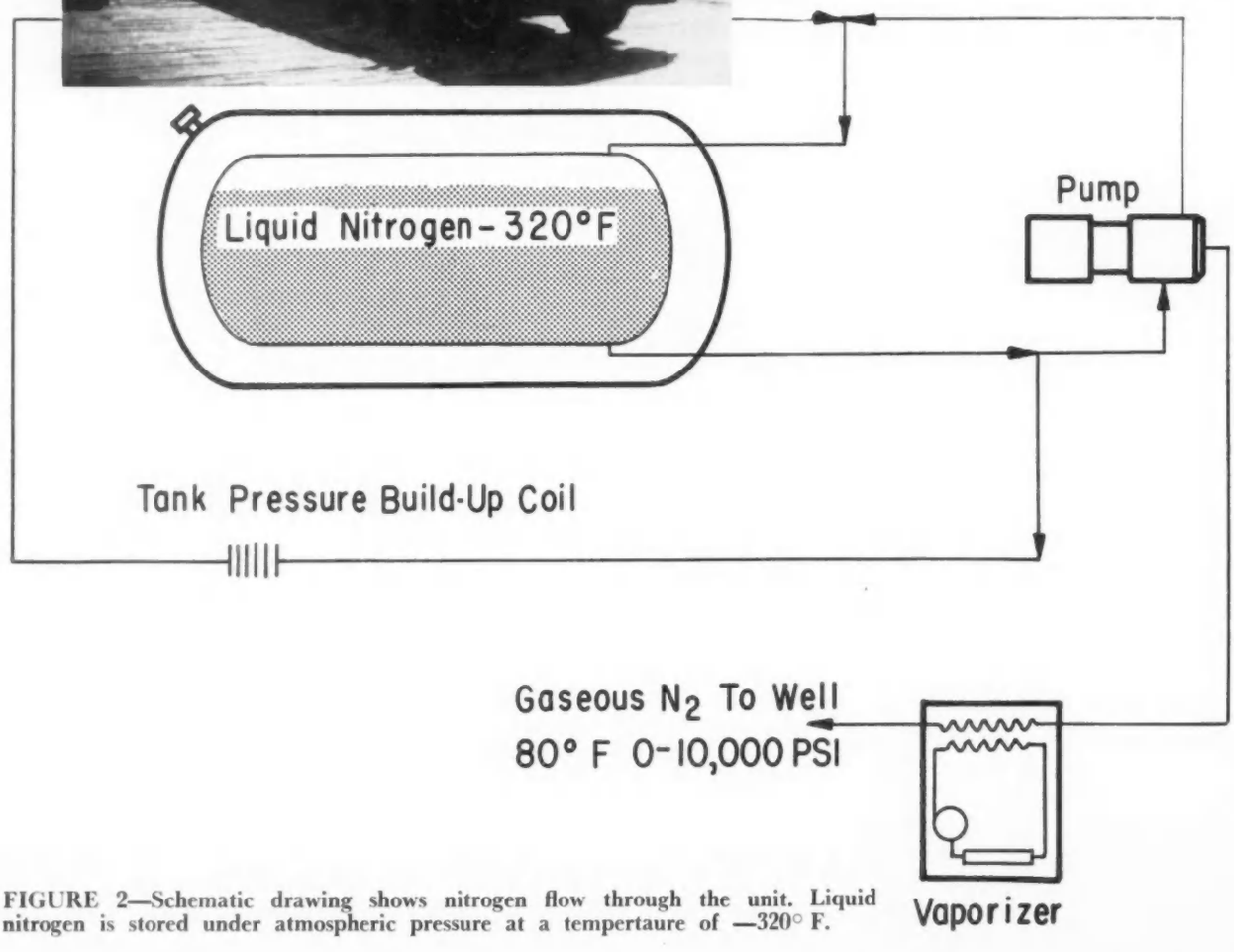


FIGURE 2—Schematic drawing shows nitrogen flow through the unit. Liquid nitrogen is stored under atmospheric pressure at a tempertaure of —320° F.

Also, well can be brought in under complete control through a choke.

2. Fracturing and acidizing. Acid, frac fluid and flush oil may be aerified when pumped into the well. Well can be recompleted without swabbing because of lightened hydrostatic head.

3. Aerification of drilling mud. Nitrogen has been used to control mud weight in critical lost circulation areas.

4. Cementing. Use of nitrogen in mud prior to cementing assures placement of cement in lost circulation areas. Hydrostatic head above cement column on outside of casing is reduced allowing proper fill-up.

5. Testing surface equipment. Blowout preventers are tested easily. Leaks have been indicated when using nitrogen which were not apparent when testing with mud or water.

Table 1 shows various applications of N_2 to drilling and producing operations.

Transport unit. The unit assembly is mounted on a heavy duty truck bed (see Figure 1). The control panel with all necessary controls and instruments for operation of the unit is located inside the folding doors at the rear of the truck. Liquid nitrogen is stored and transported at atmospheric pressure in the vessel. Since the liquid is at its boiling point, the tank pressure on the vessel gradually builds up and must ultimately be relieved through a safety valve.

Upon starting the unit, tank pressure is increased with the build-up coil; the pump then is cooled to the temperature of the liquid, with the flashed vapor returning to the tank as shown in Figure 2. When the high pressure pump is cold, the liquid nitrogen is pumped into the vaporizer where it is transformed into the gaseous phase. Gas leaves the vaporizer at temperature of 80° F and 0-10,000 psi, as required.

An internal combustion heater which is mounted on the side of the truck furnishes the heat necessary to vaporize the liquid. A continuous recording pressure chart for computing displacements and a liquid volume meter provide a record of the amount of gas used on a particular job, and also the pressure at which the gaseous nitrogen is delivered.

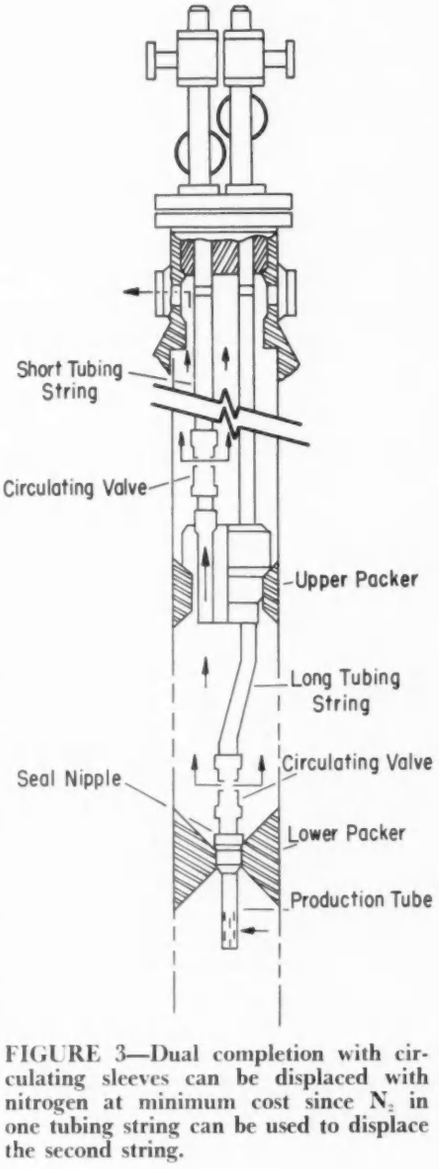


FIGURE 3—Dual completion with circulating sleeves can be displaced with nitrogen at minimum cost since N_2 in one tubing string can be used to displace the second string.

Completion. When nitrogen is used as a displacement medium on completion, swabbing is unnecessary. For example, prior to setting the packer on a single zone completion, the tubing may be displaced with nitrogen to any desired depth. The packer then may be set and the well buttoned up. Nitrogen is bled-off through a choke thus controlling entry of reservoir fluids into the well bore. The well then may be completed under complete control at all times without danger of losing a portion of the normally used column of water into the formation.

On single completions where a packer is not used, gas is injected directly into the casing thus forcing the fluid out the tubing. When nitrogen returns are noted from the tubing, a choke is installed and the remaining fluid in the tubing is displaced very slowly. After complete fluid displacement, gas is bled to atmosphere in the same manner as described previously.

Figure 3 shows a typical dual completion with two packers and two circulating sleeves. Both the upper and lower circulating sleeves are in an open position. Nitrogen is injected into the long string, forcing fluid from the long string out the lower circulating sleeve, up through the short string circulating valve and out the casing. When fluid in the long string has been displaced completely with gas, the long string sleeve is closed. The long string and short string are connected at the surface, and the gas (under pressure) in the long string is discharged into the short string, displacing fluid through

TABLE 1—Field jobs using nitrogen

Field	Type of Job	Pipe Size	Depth	Results
Sherridan Port Acres	Full bore tool displacement Full bore tool displacement	3″ Drill Pipe 3″ Drill Pipe	11,000) 12,000)	Cleared pipe through by-pass in approximately 2 hours.
Fashing West Lucky	Acid Aerification Acid Aerification	2⅞″ Drill Pipe 2″ Tubing	10,900) 8,000)	Well flowed, fluid kicked out without swabbing.
Quicksand Creek Blessing	Perforating Perforating	2″ Tubing 2″ Tubing	8,400) 9,000)	Perforated with nitrogen back pressure on formation. Prevented gun from kicking up hole.
North Dayton	Butane Injection	2″ Tubing	8,000	Washed face of sand with butane.
Fashing	Fracturing	3″ Drill Pipe	11,000	Increased penetration of Frac Fluid Aerified Flush. Unloaded without being swabbed.
Golkie	Corrosion Squeeze	2½″ Tubing	10,000	Squeezed corrosion inhibitor into formation with gas. No fluid flush.
Ringling (Okla.)	Aerification of Drilling Fluid	4½″ Drill Pipe	9,000	Aerified drilling fluid to prevent lost circulation.

the short string circulating sleeve and out the casing. Release of pressure on the long string permits entry of lower zone reservoir fluid into the well bore. When fluid is displaced in the short string, the sleeve is closed. Gas remaining in the long sleeve, along with the gas in the short string, is bled to atmosphere, and both zones are brought in slowly with a minimum quantity of nitrogen.

If circulating sleeves are not used, both tubing strings are run, spaced and suspended; the Christmas Tree installed; and the lowermost flange unbolted. The entire dual tubing assembly is lifted and nitrogen is injected into both the long string and short string. In this manner, fluid is displaced around the sealing elements to a prescribed depth. The tree and attached tubing strings then are lowered to correct position. Nitrogen is bled to atmosphere, permitting fluid entry into both completions thus eliminating swabbing.

Nitrogen also can be used on wells that have loaded up with dead oil or water. In such instances, well fluid is displaced into the formation and over-flushed with a sufficient quantity of gas. In a number of instances, drilling fluid has been produced when the well was returned to production, thus indicating that some perforations were possibly plugged.

Treating. Corrosion treatments vary from inhibitor squeezes to inhibition of casing and/or tubing walls. An example is the inhibition of the tubing string on a low bottom hole pressure well. The inhibitor used is jetted directly into the high-pressure nitrogen stream while the gas is injected into the tubing string. Fluid in the tubing is displaced into the formation. When the gas carrying the inhibitor reaches the perforations, the well is shut in with the inhibitor suspended in the gas from surface to perforations. After a predetermined exposure time, gas is bled to atmosphere and the well is restored to production without swabbing.

If a squeeze job is required, nitrogen is injected directly behind inhibited gas or a slug of liquid inhibitor, and displaced into the formation through the perforations. Surfactants and paraffin solvents may be handled in a similar manner.

Perforating and stimulation. A nitrogen cushion may be used when perforating a well through tubing. The tubing string is displaced around the packer, or through a circulating sleeve, if available. The cushion is pressured to the desired point and the gun is run and fired. The long nitrogen cushion results in a reduced liquid head on the formation, provides adequate back-pressure and is easily bled off through a choke after shooting. Again, swabbing is not required, the gun is prevented from kicking up the hole and the well is completed through a choke under complete control.

A nitrogen cushion also can be used to advantage ahead of an acid job. Aerified acid is pumped into the well, with nitrogen being introduced into the acid stream downstream of pumping equipment. Flush fluid is aerfied in the same manner. After the acid is spent, the nitrogen cushion, along with the acid gas and the nitrogen in the flush, lightens the hydrostatic head acting on bottom. Thus, the well is unloaded and restored to production in a minimum of time.

The same procedure is followed in fracturing operations.

Drilling. Surface drilling and producing equipment can be tested easily with nitrogen. Normal blowout preventer tests, flow line tests, etc., have been conducted successfully under various conditions. During some field tests, equipment tested with mud or fluid showed no sign of leaks even at extremely high pressures; however, when nitrogen was applied, leaks were detected and repaired.

The newest application for nitrogen is drilling fluid aerification. While the well is being drilled, nitrogen is injected into the stand pipe, thus aerating and lightening the mud column. Lost returns on zones where mud weight is critical thus are eliminated due to decreased hydrostatic head. After logging the well, the mud is again aerated with nitrogen for hole conditioning purposes prior to running casing.

After casing is run and circulation established, nitrogen is again injected into the mud stream prior to cementing. This lightens circulated mud outside the casing, and reduces the hydrostatic head acting to impede cement returns. Because of the reduced head, cement can be displaced to the proper fill-up level without danger of lost circulation.—**The End**

About the Authors

Plummer

Smith

Ray A. Plummer was graduated from Rice University in 1958 with a B.A. degree and a B.S. degree in chemical engineering. Prior to graduation he was employed by Dow Chemical Company and Shell Oil Company's reservoir engineering section. After graduating, he joined Big Three Welding Equipment Company as a cryogenic engineer. He now is assistant manager and chief engineer of Nitrogen Oil Well Service Company, a subsidiary of Big Three Welding Equipment Company.

Arthur W. Smith has been associated with the oil industry in various phases for the past 23 years. For 15 years he worked in the drilling and producing business in Texas and Louisiana. He spent four years in the nitrogen service business in West Texas, serving as vice president and general manager of Cook Testing Company. He joined Big Three Welding Equipment Company in October 1959, and is presently manager of Nitrogen Oil Well Service Company in Houston.

CORRECTION

The name Gulf Oil Corporation was misused in the article "How Gulf Automated a 74-Well Lease in West Texas" (Page 139, October 1960, World Oil). Since the automation project was a joint venture between Gulf and other co-owners, the name "Goldsmith San Andres Unit" should be substituted for "Gulf Oil Corporation" throughout the article.

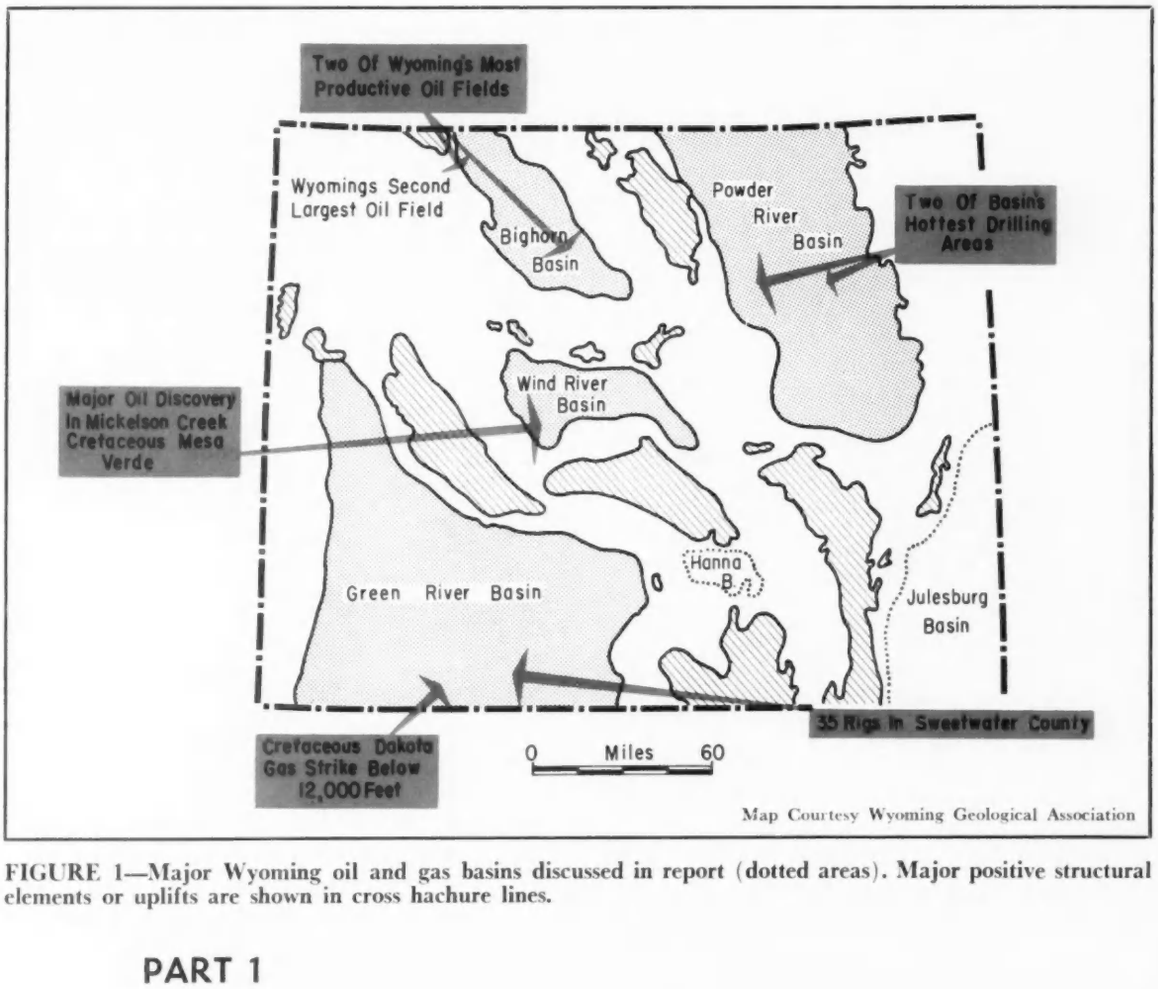

Two Of Wyoming's Most Productive Oil Fields
Wyomings Second Largest Oil Field
Bighorn Basin
Powder River Basin
Two Of Basin's Hottest Drilling Areas
Major Oil Discovery In Mickelson Creek Cretaceous Mesa Verde
Wind River Basin
Hanna B.
Green River Basin
Julesburg Basin
35 Rigs In Sweetwater County
Cretaceous Dakota Gas Strike Below 12,000 Feet
0 Miles 60
Map Courtesy Wyoming Geological Association

FIGURE 1—Major Wyoming oil and gas basins discussed in report (dotted areas). Major positive structural elements or uplifts are shown in cross hachure lines.

PART 1

ROCKY MOUNTAIN FOUR-BASIN REPORT

Here is the most complete report yet published on geology and drilling activity in the Rocky Mountains' most active drilling areas

By Joseph Kornfeld, President
Kornfeld International, Tulsa, Okla.

WYOMING ACCOUNTS FOR ABOUT ONE-THIRD of the total footage and wells drilled in the Rocky Mountain region and for more than 35 percent of all wildcats drilled currently in that region.

Moreover, the State has set significant production records from nearly all portions of the entire geological column ranging from Cambrian production at Lost Soldier Dome to Upper Tertiary production in many parts of the State.

Emphasis on stratigraphic exploration with lesser stress on structural definition features the current development throughout the principal basins of Wyoming.

There is a preponderance of exploratory drilling in the Green River, Wind River, Big Horn and Powder River Basins. In the Green River Basin, the Upper Cretaceous and the Tertiary rocks are the main objectives with concentrations in the eastern portions of the Washakie Basin, the flanks of the Rock Springs Uplift, the Big Piney-Labarge portion of the Overthrust belt as well as in several deeper portions of the Basin.

These identical Upper Cretaceous and Tertiary objectives are being sought along the northeastern limb of the Wind River Basin and on the limbs of the Big Horn Basin.

The Cretaceous Dakota and Parkman sandstones and the Pennsylvanian Minnelusa formations will continue to gain attention on the eastern limb of the Powder River Basin.

This current survey of Wyoming exploration and development will be limited to the following basins:

A. Powder River.
B. Green River.
C. Big Horn.
D. Wind River.

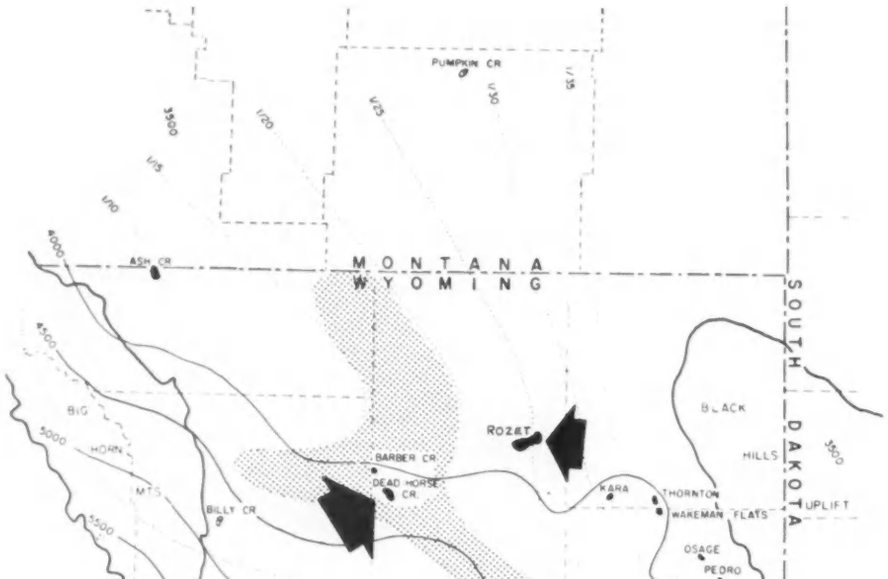


FIGURE 2—Isopachous Contour Map of Marine Upper Cretaceous formations from the top of the "Lewis" to the top of the Mowry shale. Shaded area outlines the extent of a series of stratigraphic traps occurring in the Cretaceous Mesaverde group. Arrow (left) points to one of the new active areas, Dead Horse Creek field, locale of important current development. Arrow (right) points to one of the new fast growing areas on the northeastern limb of the Basin, the Rozet field in Campbell County, Wyoming.

POWDER RIVER BASIN . . .

. . . has accounted for 40 percent of total drilling in Wyoming during 1960

POWDER RIVER, the second largest structural basin in the Rocky Mountain province, has yielded nearly one-half of Wyoming's cumulative oil production.

The three most active counties are Campbell, Crook and Weston, which have contributed 40 percent of the total drilling for Wyoming during the major part of 1960. Last year the percentage was 31 percent, and in 1958 was only 24 percent.

Rozet field—one of the most active development areas in the Basin, marked the first Muddy or Newcastle sandstone oil field discovery since development of the Greater Clareton trend.

Present producing limits extend 3½ miles from west to east and more than 3 miles from south to north.

Average drilling performance requires about 11 bits to reach the 7,100-foot Muddy sandstone oil reservoir in this field.

Lance Creek field—one of Wyoming's major oil fields, had a cumulative production as of July 1, 1960, of 94.6 million barrels.

The field is located in east-central Wyoming, in Niobrara County on the southeastern rim of the Powder River Basin. It was discovered in 1918 by The Ohio Oil Company as the result of surface geology.

Fully developed, the field is about 5½ miles long and averages about a mile in width, containing 235 wells. The wells produce from eight separate producing formations.

The Basal Sundance sand of the Sundance formation (3,500-3,800 feet) and the Leo Sands of the Minnelusa formation (4,600-5,500 feet) are the most important reservoirs in the field having produced a greater part of the cumulative oil—36,845,000 and 54,764,000 barrels respectively.

On January 1, 1956, The Ohio Oil Company became operator of the Lance Creek Units, with other working interests being Continental Oil Company and Argo Oil Corporation.

Starting in March of 1938, the Basal Sundance Unit has been under a pressure-maintenance program which involves the injecting of gas into the crestal wells. In July 1954, a Basal Sundance water flood operation was started. Similar secondary recovery operations, mainly water flooding, have been started in the Converse, First Sundance and Muddy formations.

The Leo Sand has an active water drive, with the result that additional oil has been recovered by means of bottom hole turbine pumps. At one time 12 wells were equipped with these pumps, with cumulative production amounting to 2,350,000 barrels of oil and 53,390,000 barrels of water as of July 1 of this year.

Salt Creek field—discovered in 1908, is one of America's giant oil producing areas, with cumulative production standing at about 380 million barrels at the end of 1959.

Producing today from 10 horizons, the field has been under pressure maintenance by gas injection since 1926. About two-thirds of the total area of the field is unitized with Pan American as operator.

Located about 42 miles north of Casper, the Natrona County field is experiencing increasing oil production, due to a recently initiated water flood program and increasingly efficient production practices.

The Cretaceous Shannon sandstone oil pool, just north of the salt Creek field, is the site of an insitu combustion pilot project being conducted by Pan American for Midwest Oil Corporation.

Dead Horse Creek field—discovered in 1957, opened the first commercial oil accumulation in the Mesaverde group in the Powder River Basin.

Ferguson sandstone oil reservoir in the upper part of the Cretaceous-Parkman formation is a stratigraphic trap ranging from a single lens in the northern portion up to 35 feet in thickness to as many as three zones of saturation in the southern portion at depths between 6,950 to 7,100 feet with net oil pay ranging from 10 to 35 feet per zone. Porosity ranges from 15 to 22 percent and permeability to air from 50 to 250 md.

General trend of these lenses is from northwest-to-southeast, with permeability pinchout to the northeastern limb of the Basin; an oil-water contact has been found on the northwestern side, although the field generally operates under a solution-gas reservoir mechanism. Cross-faults interrupt the reservoir.

About 17 bits are required to reach the Ferguson sandstone. Current drilling costs are about $3.00 per foot.

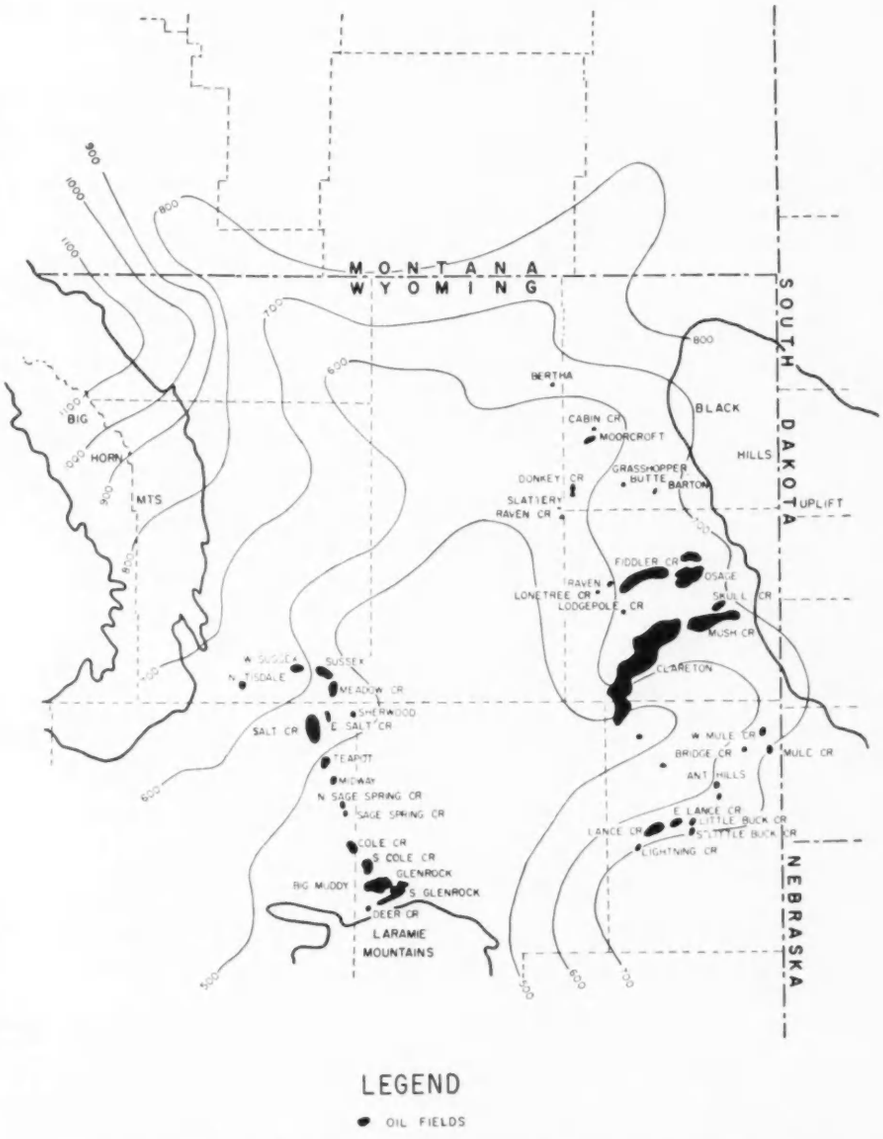


FIGURE 3—Isopachous Contour Map of Lower Cretaceous formations, from the top of the Mowry shale to the top of the Morrison formation in the Powder River Basin.

REGIONAL GEOLOGY

The Powder River Basin is bounded by prominent positive tectonic elements on all sides except on the north where it joins with the Williston Basin of southeastern Montana.

Powder River is bounded on the east by the Black Hills Uplift, on the southeast by the Hartville Uplift, on the south by the Laramie Range, on the southwest by the line of faulting and folding between the Big Horn and Laramie ranges, and on the west by the Big Horn mountains.

An accompanying subsurface structure contour map of the basin prepared on top of the Dakota formation indicates that the major axis of the basin lies near the western side.

Swenson (1953) in describing the topography of the Basin notes that it ranges from rugged mountains to semi-arid plains. Mountains, plateaus, uplands, lowland, badlands and river terraces form the varied landscape of the basin.

The drainage basin is bounded on the southwest by the Bighorn Mountains. Remaining boundaries are formed by low divides that separate the Powder River Basin from the basins of the Tongue, Little Missouri, Bell Fourche, Cheyenne, North Platte and Bighorn rivers.

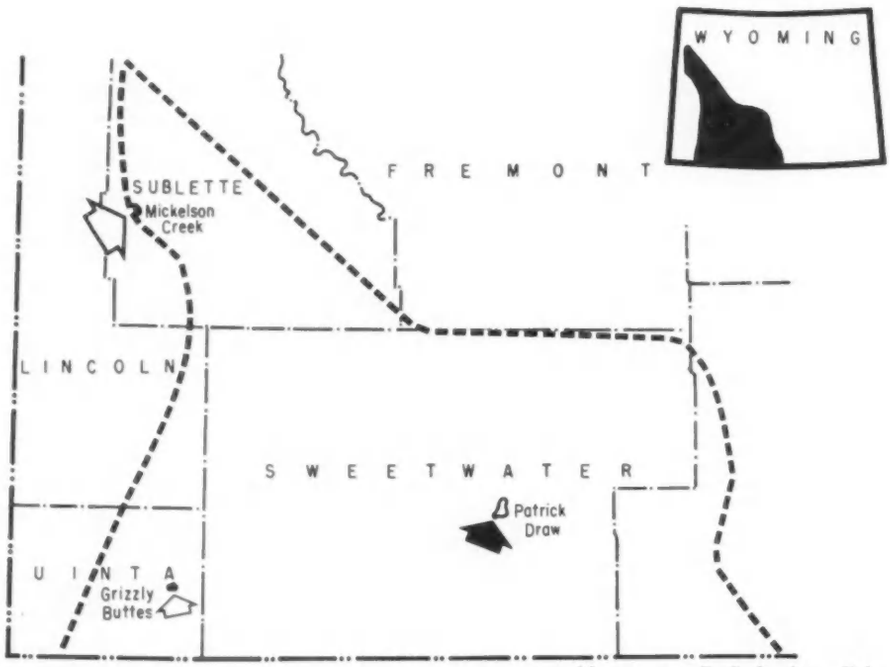
Hembree (1952) stated that rocks exposed in the Powder River schists of pre-Cambrian age and a thick series of sedimentary strata that range in age from Cambrian to Recent.

Outcrops of rocks older than Mesozoic are confined to areas in or near the mountains. Rocks of pre-Cambrian age are igneous and metamor-

phic. Paleozoic rocks are mostly limestones and sandstones, but include shales and dolomites.

Rocks of Mesozoic age crop out chiefly along the east flank of the Bighorn Mountains and over large areas in the southwest part of the basin. Sedimentary rocks of the Mesozoic era differ in erosive properties.

Rocks of Cenozoic age cover the greater part of the plains section north of Sussez. Those of Paleocene and Eocene age consist of sandstone, shale, siltstone and some coal. Small patches of rocks younger than the Eocene and older than recent alluvial deposits occur in and adjacent to the mountains.



Map courtesy E. C. Jacobson, Tulsa

FIGURE 4—Green River Basin oil and gas field map indicates by solid arrow locale of Patrick Draw oil field, one of the major hot drilling areas in the Washakie sub-basin portion of the province. Large hollow arrow points to Mickelson Creek Cretaceous Mesaverde oil discovery; latest development in the active drilling campaign in the three-state overthrust belt. Small arrow points to Grizzly Buttes, Cretaceous Dakota gas strike below 12,000 feet.

GREEN RIVER BASIN . . .

. . . 35 rigs in central Sweetwater County sparks current activity

CONCENTRATION OF 35 RIGS in central Sweetwater County in southwestern Wyoming in the prolific Cretaceous fields of Patrick Draw, Beacon Ridge, Arch, Playa, Desert Springs and West Desert Springs sparks the current play in the center of the Green River Basin, with the play sprawling over 250,000 acres.

Virtually unknown until two years ago when the Desert Springs field was discovered, the Almond sand of the Cretaceous Mesaverde group is one of the major targets in the Basin's hot development program.

Patrick Draw—The big drive came in 1959 after El Paso Natural Gas Products opened the field with completion of its Patrick Draw Unit 1 from Almond sand perforations from 5,172-98 feet for a potential of 637 barrels of oil per day on a ¾-inch choke.

Early in September 1960, the fifty-seventh oil well had been completed from the Almond sandstone oil reservoir with 10 active rotary drilling rigs. More than 9 million barrels of reserves have been proved up.

Principal unit operators are as follows: Arch Unit: Forest Oil Corporation, 22,000 acres; Beacon Ridge Unit: Texaco, Inc., 12,700 acres, and Patrick Draw Unit; El Paso Natural Gas Products, 12,700 acres.

Typical casing and cementing program calls for setting the 10¾-inch surface casing at 214 feet with 250 sacks. Long string of 5½-inch casing is set through the Mesaverde pay below 5,000 feet and cemented with 450 sacks.

Principal contractors include Hewit-Gulick and Sprecher Drilling Company. About 16 days are required from spudding to completion operations.

Mickelson Creek—newest discovery well in the leading exploration area in Wyoming, is the new Cretaceous Mesaverde sandstone oil discovery, 12 miles north and west of Big-Piney-Labarge in the overthrust belt. The most northern oil field in the Green River Basin, the field was opened during August 1960, by Raymond L. Smith's Mickelson Creek Unit 2 in Sublette County. Initial production was 360 barrels of oil per day through $^{22}/_{64}$-inch choke from perforations from 3,536-49 feet and a 4-inch window at 3,546 feet in the Mesaverde sandstone.

Mickelson Creek opens a new segment of the Green River Basin in the overthrust belt, the most complex exploration area of Wyoming.

Big Piney field—more than 13,500 acres have been proved from a broad stratigraphic trap extending for 18 miles along a north-south axis and from 3 to 5 miles in width. More

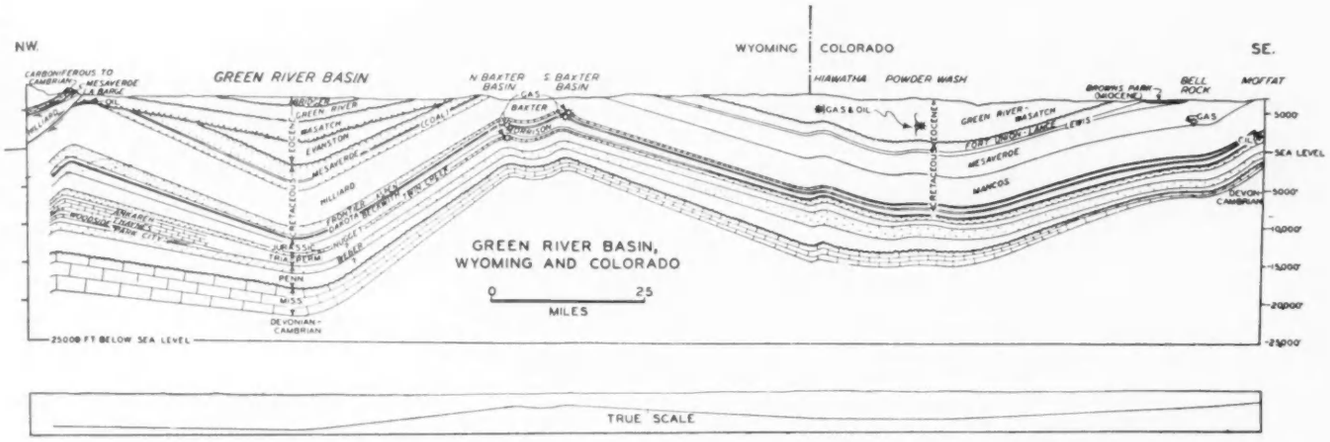


FIGURE 5—Generalized cross section across Green River Basin in Wyoming and Colorado.

than 14 separate Tertiary producing gas zones have been under development sporadically since 1952.

Grizzly Buttes Unit—a new gas area, was opened up in the deep Cretaceous Dakota sandstone series in Uinta County, Wyoming, in the extreme southwestern corner of the Green River Basin in August 1960.

The discovery well, Max Pray and Sohio Petroleum Company's Government Akridge 1, flowed an estimated 18 MMcf gas per day during a 50-minute drillstem test from 12,878-12,964 feet in the upper part of the Dakota sandstone encountered at 12,871 feet. Coring was conducted continuously from 12,771 to 13,053 feet and the well was bottomed at 13,090 feet.

Signal Drilling and Exploration, Inc., Casper, Wyo., drilled 13,090 feet of hole in 69 days with 86 bits, spudding on June 1, 1960, and reaching total depth on August 26, 1960.

Signal cut a 17½-inch surface hole to 248 feet and set 13⅜-inch to that depth and cemented with 195 sacks; the hole was reduced to 11-inch and drilled to 5,904 feet where the 8⅝-inch protection string was set and cemented with 1,650 sacks; hole was then reduced to 7⅞-inch and drilled to 13,090 total depth, and the long string of 5½-inch set 5 feet off bottom and cemented with 250 sacks for completion.

WELL LOGGING PROCEDURES

Primary objective in the Green River Basin are the Mesaverde group and Frontier sandstones of Upper Cretaceous age. The Mesaverde group is composed of the Almond, Ericson and Rock Spring sandstones.

Porous zones extend from two to several hundred feet in thickness. Drilling muds are fresh. Fresh-mud logging programs have been universally adopted.

Formation waters. Relatively fresh formation waters are encountered in drilling Upper Cretaceous sandstone reservoirs in the Green River Basin. Range of values of R_w are as follows:

Formation	Resistivity at 100° F ohm-meters
Cretaceous:	
Mesaverde Group	0.15 to 0.40
Frontier sandstone	0.50 to 0.75

These conditions require the following:

1. Use of fresh-mud type resistivity logs (R_{mf}/R_w) ratios in the Green River Basin usually range from 2.0 to 10.0.
2. Good vertical resolution, i.e., ability to evaluate thin beds when they are encountered.

RECOMMENDED LOGGING PROGRAM IN CRETACEOUS SANDSTONE RESERVOIRS

Conditions: Fresh Mud (R_{mf}/R_w 5)

Property Sought	Recommended Survey
Basin resistivity log	Induction-electrical
Porosity measurement	sonic microlog

REGIONAL GEOLOGY

Green River, a topographic and structural basin in southwestern Wyoming, may be subdivided into auxiliary basins. In this case the name Green River is restricted to the northwestern portion of the basin. The name Bridger Basin may be applied to the southwestern portion of the basin. Washakie Basin, an auxiliary basin within an outward facing escarpment of the Green River formation east of the Rock Springs Uplift. The northwestern part of the greater Green River Basin is called the Red Desert Basin.

Blackstone (1955) has reviewed the tectonics of the Green River Basin and adjoining positive elements. (See accompanying map.)

Wind River Mountains. The pre-Cambrian core of the Wind River Range is overlapped by Eocene and Miocene sediments. A thrust fault dipping at an angle of 45° marks the southwest flank of the range.

Eastern Basins. Three structural basins arranged along a north-south line are the Red Desert, Washakie and Sand Wash. Two of these basins are bounded on the west by the Rock Springs Uplift and the latter is bounded on the southwest by the Uinta Mountain extension.

Rock Springs Uplift. The largest anticlinal uplift in Wyoming which still retains a sedimentary cover of Cretaceous rocks is the Rock Springs Uplift. However, other uplifts of comparable size have been eroded deeply enough to expose either pre-Cambrian or Paleozoic rocks. This uplift exhibits a steeply dipping west-

ern limb, but a broadly bulged, but gently dipping east limb.

Bridger Basin. One of the major structural basins of the entire Rocky Mountain province occupies the area lying between the Rock Springs Uplift, Wind River Mountains, Uinta Mountains and the overthrust belt of western Wyoming.

Deep drilling at Pacific Creek proves the existence of more than 21,000 feet of sedimentary rocks.

A striking feature of the Basin is the existence of structural relief of at least 28,000 feet between the floor of the basin and the adjacent Wind River Range to the northeast where the surface of the pre-Cambrian rises to more than 14,000 feet above sea level in the Wind River Range. The structurally lowest contours of the basin occur in the area immediately adjacent to the front of the Wind River Mountains in the northeastern part of the basin.

Uinta Mountain Uplift. The Uinta Mountains were formed on the site of an east-west pre-Cambrian trough into which were deposited the clastic sediments known as the Uinta group. The range trend east-west from near Park City, Utah to near Browns Park at which point the trend of the ranges changes to N. 55° W.

The east-west trending portion of the range forms the southern margin of the Bridger Basin and the southeastern trending part forms a boundary for the Sand Wash Basin and related features.

LOGGING PROGRAM FOR THE PARADOX BASIN

By G. F. Chambliss

Until a few months ago, the primary objective of the majority of the wells drilled in the Paradox Basin was the Hermosa Group of the Pennsylvanian Formation. However, recent discoveries in the Mississippian and Devonian lead us to believe that future wells will be drilled to these older and deeper formations.

Any resume of a logging program in the Paradox must, therefore; be broken down into two separate programs, depending upon the primary geologic objective of the well.

Many times both logging programs will be utilized on the same well. This will be necessary to evaluate both the Pennsylvanian and the Mississippian-Devonian when these are dual objectives of a particular well.

• **Pennsylvanian.** The oil productive zones of the Pennsylvanian are the Desert Creek (Paradox member of the Hermosa) and the Bluff or Ismay (Upper Hermosa). These formations usually have formation waters ranging from 50,000 ppm NaCl to as high as 200,000 ppm NaCl. With an average formation temperature of around 120°, this corresponds to a formation water resistivity range from 0.08 ohm-meters to as low as 0.028 ohm-meters.

Drilling muds normally are of the fresh mud (Gel) type with a salinity averaging 5,000-10,000 ppm NaCl.

These formations contain a somewhat mixed lithology; however, production is mostly from limestones, and to a lesser degree, dolomites.

• **Mississippian-Devonian.** The oil and gas productive zones are the limestones and dolomites of the Mississippian, and also the sandstones of the McCracken (Devonian). The formations carry waters ranging up to 200,000 ppm NaCl.

Drilling muds are normally salt saturated and; therefore, in the same salinity range as the formation waters.

Because of the extremely mixed lithology capable of production (limestones, dolomites, and sandstones, it is advisable to run two porosity tools and compare the results. Such a comparison will in many cases show a distinction between sandstones and the carbonates.

Recommended Logging Program—Pennsylvanian

Data Desired	Curve from which to best obtain this data	Logging Device
Rw	1. SP	1. induction-electrical log 2. electrical survey
Rt	1. induction curve 2. long normal	1. induction-electrical log 2. electrical survey (poor)
Porosity	1. sonic 2. neutron 3. microlog	1. sonic log 2. gamma ray-neutron 3. microlog-caliper (mostly qualitative)
Lithology	1. gamma ray 2. sonic	1. gamma ray-neutron 2. gamma ray sonic
Permeability indication	1. microlog 2. formation tester	1. microlog-caliper 2. formation tester
Correlation		1. sonic-gamma ray 2. gamma ray-neutron 3. induction-electrical log

Recommended Logging Program—Mississippian-Devonian

Data Desired	Curve from which to best obtain this data	Logging Device
Rt	1. laterolog	1. laterolog
Porosity	1. sonic 2. neutron 3. microlaterolog	1. gamma ray sonic 2. gamma ray neutron 3. microlaterolog-caliper
Lithology	1. gamma ray 2. sonic-neutron plot	1. gamma ray sonic 2. gamma ray sonic and gamma ray neutron
Permeability indication	1. microlaterolog 1. formation tester	1. microlaterolog-caliper 1. formation tester
Correlation		1. sonic gamma ray 2. gamma ray neutron 3. laterolog-gamma ray

Part 2 of the Rocky Mountain Four - Basin Report will describe activity and geology in the Wind River and Big Horn Basins

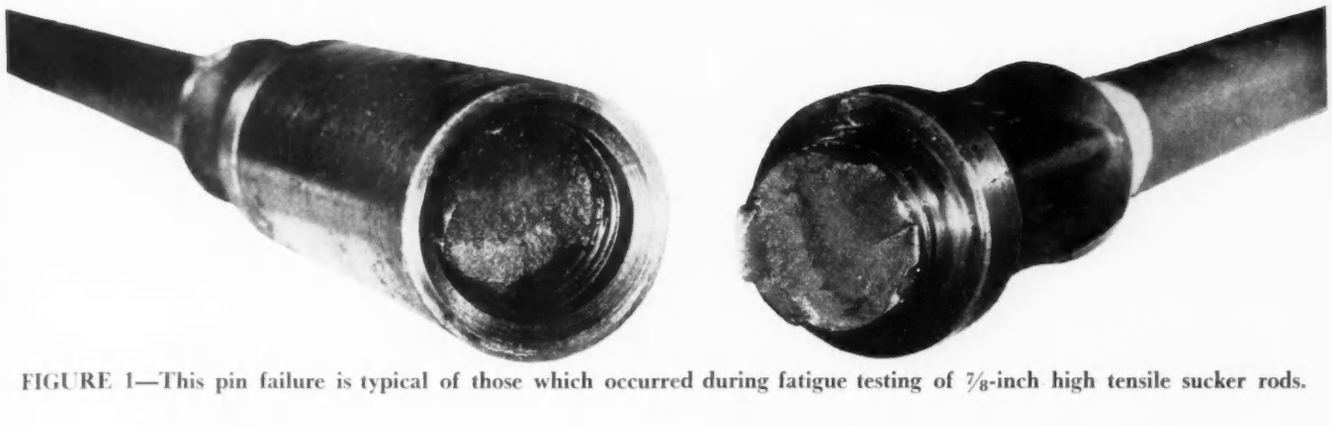


FIGURE 1—This pin failure is typical of those which occurred during fatigue testing of 7/8-inch high tensile sucker rods.

How to reduce high tensile sucker rod joint failures

Tests indicate proper make-up is important factor in preventing pin breakage. Best results are obtained with torques in 400-650 ft.-lb. range

By J. L. Walmsley, Supervisor
and R. W. Helman, Engineer
Research Dept., Bethlehem
Steel Co., Bethlehem, Pa.

A RECENTLY COMPLETED testing program on high tensile, 7/8-inch sucker rods has indicated that proper make-up torque plays an important role in reducing rod failure frequency. The tests were performed on rod joints torqued to 150, 400 and 650 foot-pounds. Both standard API and slim hole couplings were used. Results indicated:

- When joints are assembled with only 150 foot-pounds torque, 100 percent pin failure may be expected.
- At a torque of at least 400 foot-pounds, the one million-cycle fatigue strength of the joints is approximately the same as that of the rod body.
- Increasing torque from 400 to 650 foot-pounds reduces pin failure frequency, in relation to all breaks, from 36 to 13 percent.
- Coupling type, API Standard or slim hole, has no effect on pin failure frequency or fatigue strength of the joint in the torque ranges used.

To pump oil from deep wells without excessive breakage or an undesirable increase in diameter and weight of sucker rod strings, a need has been created for rods of increasingly higher strengths. In accordance with this trend, a normalized and tempered high tensile rod was recently introduced to the industry. Mechanical properties of the high tensile type rod are shown in comparison with three older grades in Table 1.

All grades for the most part, are manufactured in standard 25-foot lengths and are provided with sleeve couplings and threaded pins on the rod ends for joining into strings—which in deeper wells may run to 10,000 feet or more in length. The thread details used in the joint components of these rods have been governed by strict industry standards (American Petroleum Institute Specifications for Sucker Rods—A.P.I. Std. 11-B, 1957).

String breakage due to failure of the threaded pin always has been somewhat of a problem in the industry. In the case of older rod grades, however, the incidence of pin failure to all types of breaks was of low proportions. This was indicative of a balanced rod design, and was not a cause for concern.

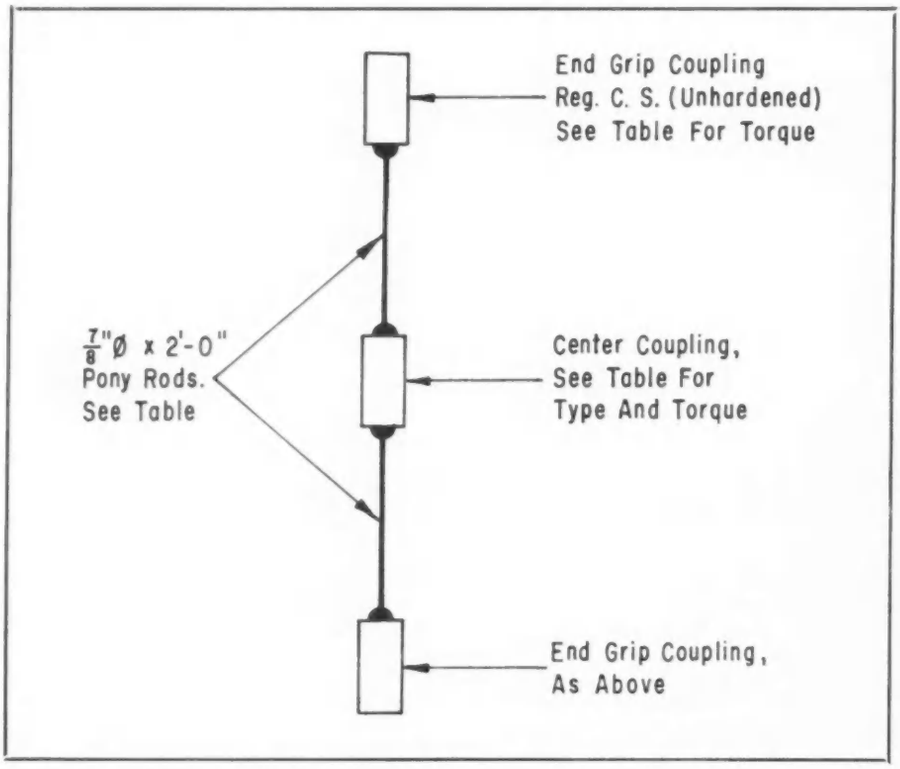
Shortly after introduction of the high-tensile rod, substantial numbers of pin breaks occurred in several wells in which the new rods had been installed. As an example, a manufacturer had to replace complete rod strings in two wells after less than 12 months service.

All failures were clearly fatigue fractures occurring in the threaded area of the pins. Most of the rods involved were of 7/8-inch diameter which, in accordance with the API specifications, have an inherently low pin-to-rod area ratio. Most had been installed with slim hole couplings rather than the slightly larger standard couplings.

To determine the cause of these failures, a program of fatigue tests on full-size sucker rod joints was initiated. Figure 1 shows a typical pin failure resulting from the tests.

TABLE 1—Mechanical properties of the high tensile type rod compared with three older grades now in use.

General Group Classification	High Tensile	Nickel-Molybdenum	Intermediate Alloys	Carbon-Manganese
Yield Point, psi	100,000 min. 110,000 avg.	67,000 min. 75,000 avg.	60,000 min. 65,000 avg.	65,000 min. 72,000 avg.
Tensile Strength, psi	120,000 min. 130,000 avg.	82,000 min. 90,000 avg.	88,000 min. 95,000 avg.	93,000 min. 100,000 avg.
Elongation, 2", Pct.	24 min. 30 avg.	35 min. 38 avg.	32 min. 35 avg.	30 min. 37 avg.
Reduction of Area, Pct.	55 min. 60 avg.	63 min. 68 avg.	50 min. 60 avg.	55 min. 60 avg.



API STANDARD THREAD SPECIMENS

Type Center Coupling	Standard CH & G			Slim Hole		
Specimen Group	A1-6	B1-5	C1-6	D1-6	E1-6	F1-7
Center Joint Torque—Ft. Lbs.	150	400	650	150	400	650
Grip Coupling Torque—Ft. Lbs.	400	400	C1-2-3 = 400 C4-5-6 = 650	400	400	F1-2 = 400 F3-7 = 650

FIGURE 2—Test specimens of the high tensile rods were assembled as shown here. Make-up torque for all specimens is included in the tabulation.

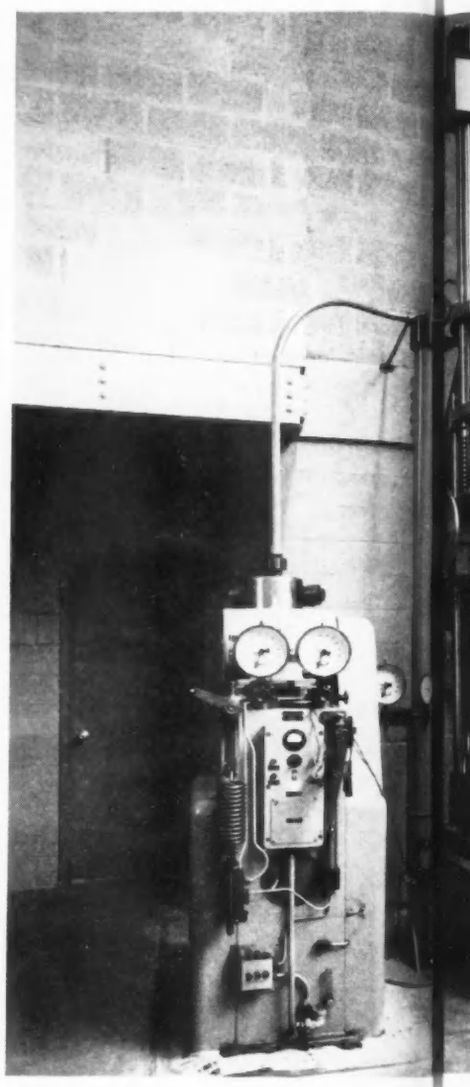


FIGURE 3—Here is the fatigue testing machine which was used to load the high tensile rod specimens. The load

Fatigue tests. High tensile type 7/8-inch diameter x 2 foot pony rods were used for the tests. All rods were normalized at 1,600° F and tempered at 1,180° F.

Thirty eight fatigue test specimens of six kinds were assembled. Each specimen was made up of two pony rods joined by either an API standard case-hardened and ground coupling or a slim hole coupling. The type of coupling was varied at the center joint only. An API standard unhardened coupling was placed on each end of all specimens for gripping purposes. In making up the specimens, each joint was well lubricated with graphite, and care was taken to make sure that the joints shouldered properly. Torques were measured with a hand torque wrench. Figure 2 shows a schematic sketch of an assembled specimen with a tabulation of the make-up of all specimens.

Procedure. The testing was done by repetitive axial loading of the specimens on a pulsating fatigue-testing machine (Figure 3). The load cycle for each specimen was from zero to a predesignated maximum tensile load at the rate of 260 cycles per minute. The number of cycles at failure was noted. If failure had not occurred after 1 x 10^6 cycles of load, the specimen was removed from the machine.

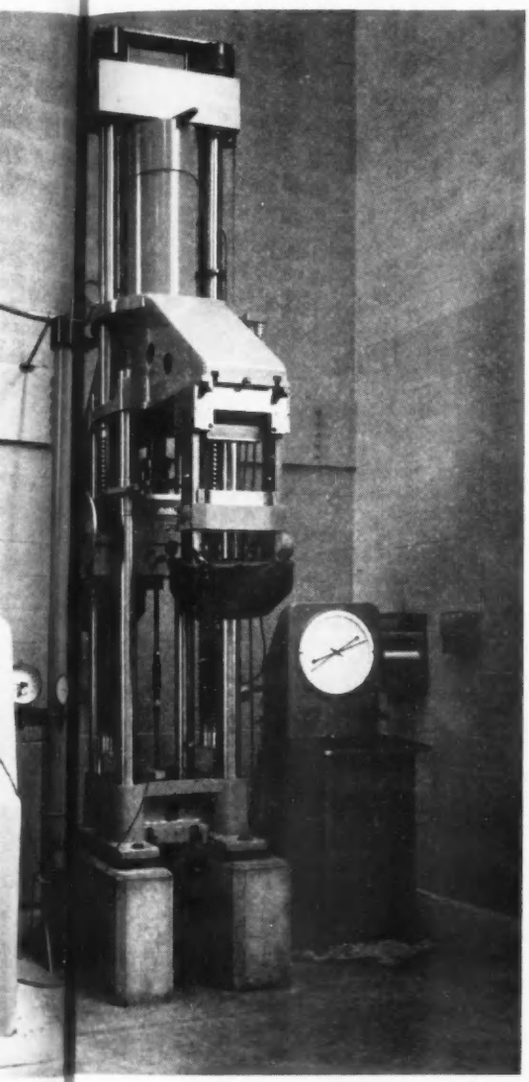
Every effort was made to select maximum loads that would define the endurance curve between 300,000 and one million cycles for each joint torque and each coupling. Five or six specimens per group were used in most cases, although seven specimens were tested where results were widely scattered or where expected and actual results did not coincide.

Results. A complete tabulation of all the fatigue-test specimens and load-cycle data appears in Table 2. Using these load-cycle data and the method of least squares, six S-N curves of the form $P = aN^b$ were prepared (Figures 4 and 5). The intercepts of these lines with $N = 1 \times 10^6$ are shown in Table 3 for the various couplings and torques.

Table 3 indicates that the type of coupling had no definite effect. The results of groups which differed only by type of coupling therefore may be combined. Table 3 also shows the average one-million-cycle intercept (combining the two types of couplings) for each torque and the percentage of pin failures in each case (see Figure 6).

The average one million cycle fatigue strengths in Table 3 are shown graphically in Figure 6 as a function of joint torque.

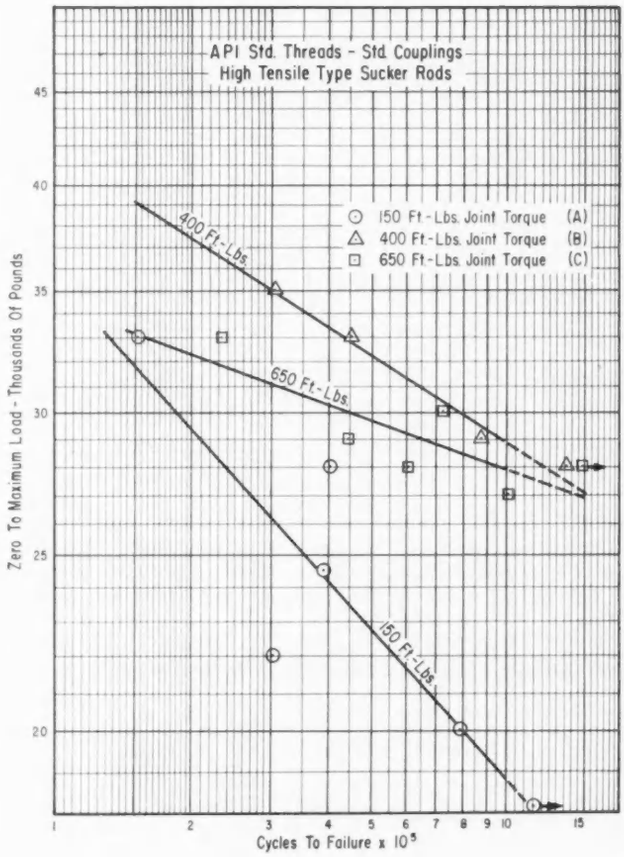
The one million cycle intercept values listed in Table 3 should be a



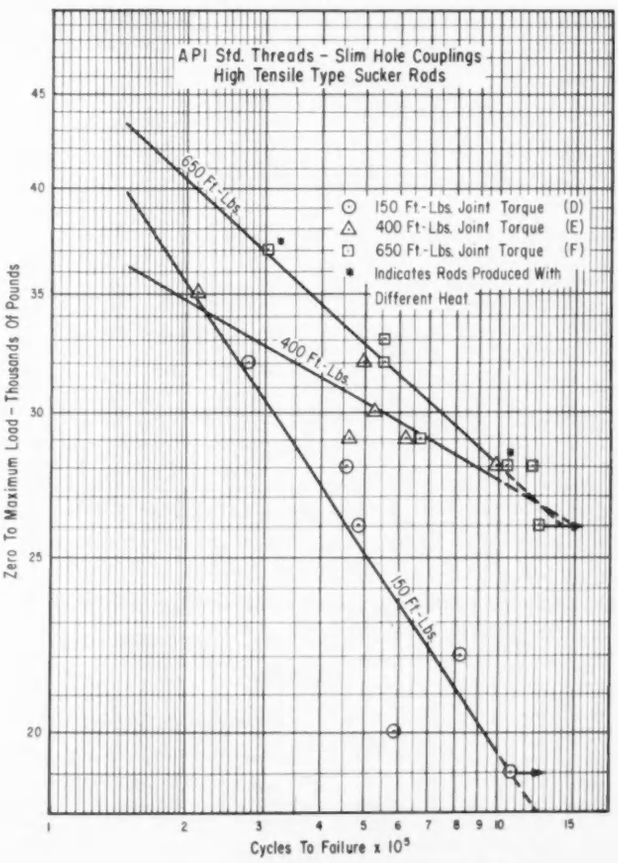
cycle for each specimen was from 0 to a preset maximum tensile load at the rate of 260 cycles per minute.

useful indication of the relative merits of the various couplings and torques under service condition. Small differences (under 6 percent) between groups in this table may be the result of scatter. In view of the limited number of test specimens per group, these are not significant. For this reason, all results in Figure 6 are shown boxed into groups connected by lines to indicate a probable scatter band and trend of the fatigue strength, as a function of joint torque.

There did not appear to be any progressive loosening of any joint while a test was running. The type of coupling at the center joint had no evident effect on the number of pin failures or the endurance limits in these tests. A small effect of coupling size had been expected in tight joints (none in 150-foot-pound joints) from theoretical calculations, if the strength


API Std. Threads - Std. Couplings
High Tensile Type Sucker Rods
150 Ft.-Lbs. Joint Torque (A)
400 Ft.-Lbs. Joint Torque (B)
650 Ft.-Lbs. Joint Torque (C)
400 Ft.-Lbs.
650 Ft.-Lbs.
150 Ft.-Lbs.
Zero To Maximum Load - Thousands Of Pounds
Cycles To Failure x 10⁵

FIGURES 4 and 5—These S-N curves were prepared using load-cycle data from Table 2 and the method of least squares. Note that the type coupling (Figure 3-standard, Figure 4-slim hole) had little effect on results.


API Std. Threads - Slim Hole Couplings
High Tensile Type Sucker Rods
150 Ft.-Lbs. Joint Torque (D)
400 Ft.-Lbs. Joint Torque (E)
650 Ft.-Lbs. Joint Torque (F)
* Indicates Rods Produced With Different Heat
650 Ft.-Lbs.
400 Ft.-Lbs.
150 Ft.-Lbs.
Zero To Maximum Load - Thousands Of Pounds
Cycles To Failure x 10⁵

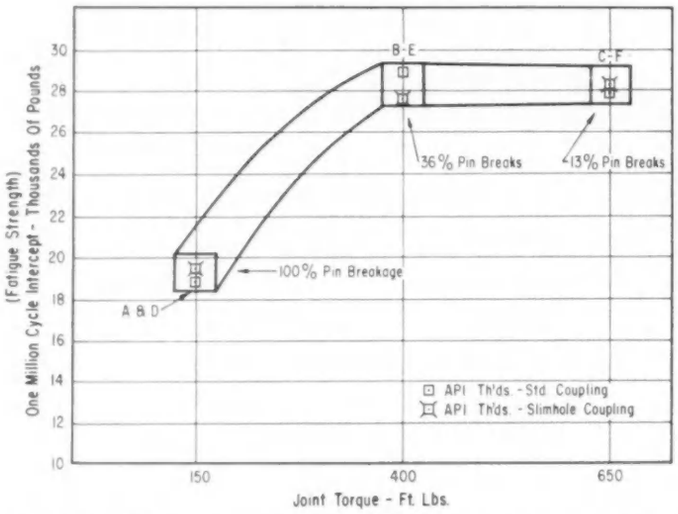


FIGURE 6—The average one million cycle fatigue strengths in Table 3 have been plotted here as a function of joint torque. Results were boxed into groups to indicate a probable scatter band, and the trend of the fatigue strength as a function of make-up torque.

TABLE 2—Load cycle data for all high tensile rod specimens tested.

Spec. No.	Thread	Coupling	Torque	Load Cycle Lbs.	No. Cycles To Failure	Remarks[1]
A1	A.P.I. Std.	Standard	150 lbs.	0–33000	153,600	2nd R. O. Thd.
A2				0–28000	405,600	2nd R. O. Thd
A3				0–24500	385,100	2nd R. O. Thd.
A4				0–22000	302,700	2nd R. O. Thd.
A5				0–20000	779,000	2nd R. O. Thd.
A6				0–18000	1,152,000	No Failure
B1	A.P.I. Std.	Standard	400 lbs.	0–33000	456,200	E.C. 2nd R.O. Thd.
B2				0–28000	1,398,000	Wrench Sq.
B3				0–30000	741,400	Wrench Sq.
B4				0–29000	879,700	Wrench Sq.
B5				0–35000	314,700	2nd R.O. Thd.
C1	A.P.I. Std.	Standard	650 lbs.	0–30000	745,200	E.C. 2nd R.O. Thd.[2]
C2				0–33000	231,400	Rod Fillet[2]
C3				0–28000	611,800	Wrench Sq.[2]
C4				0–28000	1,454,700	No Failure
C5				0–29000	447,200	Rod Fillet
C6				0–27000	1,023,000	No Failure
D1	A.P.I. Std.	Slim Hole	150 lbs.	Spoiled	.....	.....
D2				0–22000	828,300	1st R.O. Thd.
D3				0–26000	483,300	1st R.O. Thd.
D4				0–28000	453,350	2nd R.O. Thd.
D5				0–20000	587,650	3rd R.O. Thd.
D6				0–16000	1,131,000	No failure—Omit Due to Low Load
D7				0–32000	277,000	2nd R.O. Thd.
D8				0–19000	1,139,600	No Failure
E1	A.P.I. Std.	Slim Hole	400 lbs.	0–28000	998,250	2nd R.O. Thd.
E2				0–30000	534,300	2nd R.O. Thd.
E1				0–32000	500,000	Wrench Sq.
E4				0–29000	457,200	Wrench Sq.
E5				0–35000	211,900	Rod Body
E6				0–29000	642,300	Wrench Sq.
F1	A.P.I. Std.	Slim Hole	650 lbs.	0–26000	1,296,000	No Fracture[2]
F2				0–28000	1,198,000	E.C. 2nd R.O.[2]
F3				0–32000	561,700	Rod Body
F4				0–33000	555,000	Rod Body
F5				0–29000	667,100	2nd R.O. Thd.
F6				0–37000	309,500	Rod Body[3]
F7				0–28000	1,046,700	Rod Body[3]

Note: [1] Failures are pin breaks unless otherwise noted. All breaks are at center coupling unless noted. E.C. indicated end grip coupling. R.O. indicates runout thread.
[2] End Coupling Torque 400 ft. lbs.
[3] Rod produced with different heat.

TABLE 3—Intercepts of the S-N curves (Figures 4 and 5) with $N = 1 \times 10^6$.

FATUGUE TEST RESULTS
HIGH TENSILE TYPE SUCKER ROD—⅞-INCH DIAMETER
ONE-MILLION-CYCLE LOAD INTERCEPTS
(POUNDS)

PIN THREADS	Torque Ft. Lbs.	TYPE COUPLING		Average	Percent Pin Failures
		Standard	Slim Hole		
A.P.I. Standard	150	18,815	19,495	19,155	100
	400	28,970	27,550	28,260	36
	650	27,970	28,105	28,040	13*

* Percentage based on a few pin failures—approximate only.

About the Authors

Walmsley

Helman

James L. Walmsley was graduated from Alabama Polytechnic Institute in 1926 with a B.S. degree in civil engineering. He was employed by Bethlehem Steel Company in 1926 as a bridge engineer. In 1943, he was transferred to the Research Department where he was concerned with structural and engineering mechanics problems. He now is supervisor of stress analysis and testing in engineering mechanics in the Research Department. He is a member of the American Society of Civil Engineers, the Society for Experimental Stress Analysis and the American Welding Society. He is presently a member of the local sections committee of SESA and has served on the Weld Stress Committee of the Welding Research Council and on the joint committee on mill rolls research of the Association of Iron & Steel Engineers-Rollmakers' Institute.

Robert W. Helman received a B.S. degree in mechanical engineering from Lafayette College, Easton, Pa., in 1950. Upon graduation, he was employed by Bethlehem Steel Company as a foreman in the Central Tool Department. He was transferred to the Research Department in 1954. He now is a research engineer responsible mainly for structural products development and improvement. He is a member of the American Society of Mechanical Engineers.

of the pin controlled. There was only one coupling failure in the test series—a slim hole coupling at the center joint made up with 650 foot-pounds torque.

It should be noted that a joint torque of 512 foot-pounds was proposed by A. A. Hardy[1] for ⅞-inch diameter rods on the basis of providing a nominal prestress of 40,000 psi[2] in the pins. This figure is just under the mean of the two higher torques used in these tests.

LITERATURE CITED

[1] "What to Do About Sucker Rod Failures"—A. A. Hardy; WORLD OIL, February 1, 1956.
[2] Calculations based on the torque-tension relationship provided in a metallurgical report dated Aug. 19, 1955, would indicate a nominal pin-stress of only 33,000 psi for a torque of 512 foot-pounds.

3. CARE AND MAINTENANCE OF TOOL JOINTS

By Sterling G. Marshall, Tubular Products Engineer
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Reed Roller Bit Co., Houston

Tool joint threads and shoulders will sustain damage occasionally, despite the best efforts on the part of personnel to avoid it.

If the damage is extensive or serious, the connection should be re-worked by a qualified machine shop, or the tool joint replaced with a new one. However, most damage resulting from handling can be repaired on the rig with hand files, if the damage is detected early and corrected promptly.

Crews should be carefully instructed in the technique of using files and shoulder dressing tools. Correct filing can correct damage, but if incorrectly done, the connection could be damaged beyond repair.

The basic idea in field repair of tool joints is to remove the trouble making high spots avoiding excessive filing of these areas that could eventually lead to tool joint failures.

The accompanying photographs show the correct techniques recommended in checking and repairing minor damage in the field.

Buoyancy factors influence bit weight. When programming bit weights and figuring the drill collar string required, be sure to consider the buoyancy factor of the mud. (See Appendix IV). A drill collar in mud will decrease in weight equal to the weight of the volume of fluid it displaces. For instance, a 6¼-inch O. D. x 2¾-inch I. D. x 30-foot drill collar weighs 2,520 pounds in air and contains a volume of steel of 9,260 cubic inches, which is equivalent to 40 liquid gallons in volume. When run in a hole which contains mud weighing 10 ppg . . . it displaces 40 gallons of the mud, the total weight of which is 400 pounds. Therefore, the effective weight of the drill collar in the mud is 2,520-400 or 2,120 pounds.

The buoyancy factor for various weight muds is given on the graph. It shows the net effective weight of drill collars when suspended in mud as a percent of their weight in air. From the graph, drill collars in 10 ppg mud will weigh only 84.7% of what they weigh in air. If the string weighs 25,000 pounds in air, it will weigh 21,200 pounds in 10 ppg mud. Also, it will weigh only 20,400 pounds in 12 ppg mud; and 19,650 pounds in 15 ppg mud.

To keep the "neutral point" (when the bit is on bottom and weight is on it, the point where the stresses in the drill string go from compression to tension) in the drill collar string at all times, additional drill collar weight (10-20 percent) over and above the weight applied to the bit plus the allowance for buoyancy, should be available. As an example, if it is desired to run 20,000 pounds on the bit, and the mud weighs 11 pounds per gallon, the drill collar weight in air should be:

$$(20{,}000 + 10\%) \div \text{Buoyancy factor}$$
$$(20{,}000 + 2000) \div .831 = 26{,}400 \text{ pounds}$$

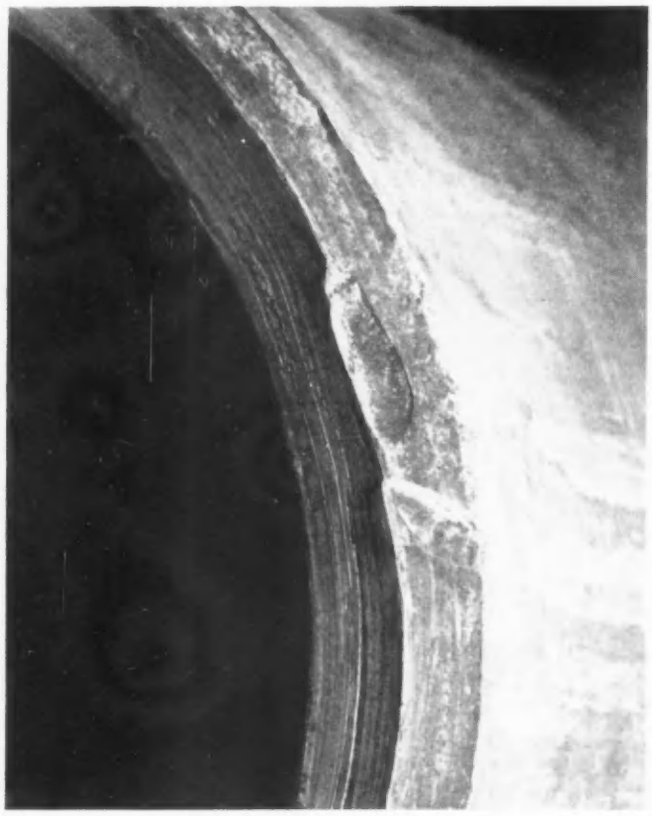


FIGURE 45—This close-up shows typical shoulder damage which can result from a blow close to the shoulder. Note that the blow has created "high spots" on the shoulder, which, if not removed, would cause galling, a washout, or possibly a broken pin and a fishing job.

FIGURE 46—A straight edge placed across the shoulder at the point of damage reveals the "high spot."

FIGURE 47—Here is shown the correct way to file the shoulder. The filing must be done carefully with the file held parallel to the shoulder face.

FIGURE 48—A close-up of the damaged area just after filing has been started. Note that the "high spots" only are being filed.

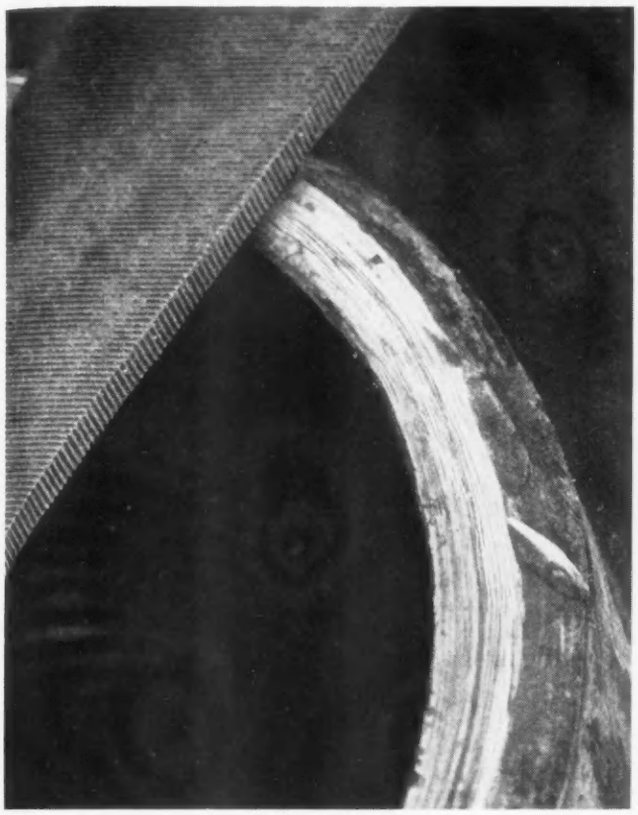


FIGURE 49—Here the filing is almost finished. "High spots" are virtually flush with the rest of the shoulder face.

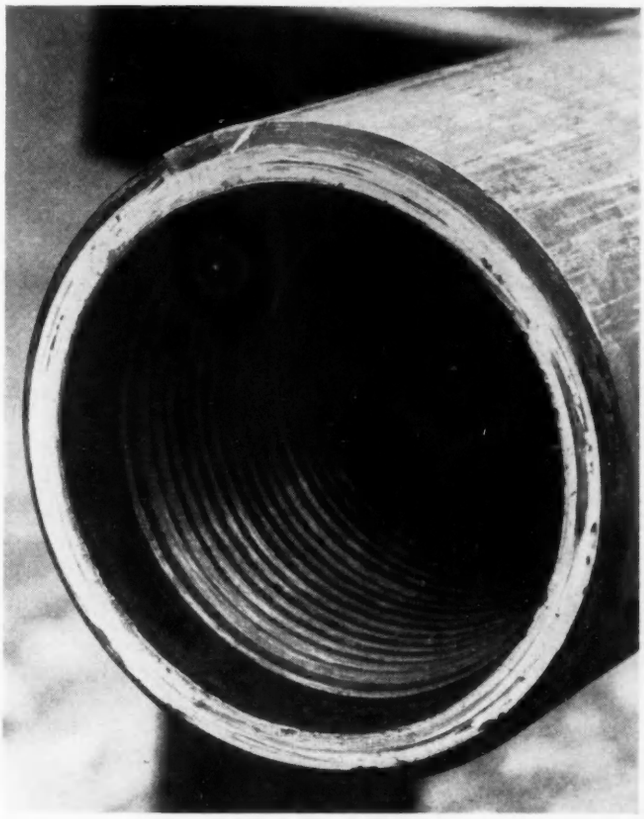


FIGURE 50—Repair completed. To finish off, the entire shoulder has been "touched up" to provide a good sealing surface around the entire circumference. The circumferential groves are low spots which do not affect the performance of the connection. All unnecessary filing is to be avoided.

FIGURE 51—The repaired joint is being checked for shoulder flatness. It should be checked in several directions around the area of change to make sure excessive filing has not created a low area.

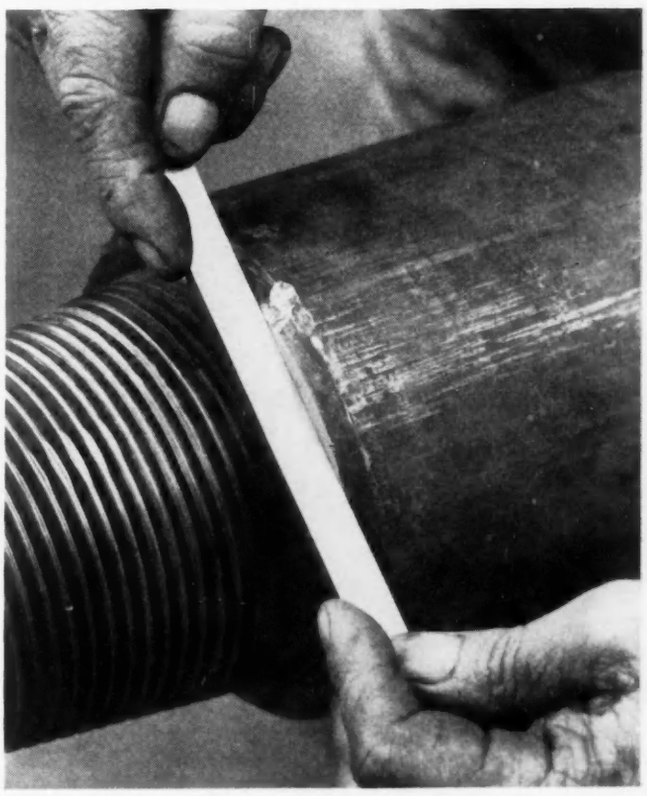


FIGURE 52—A damaged pin shoulder being checked for flatness. A blow has caused the raised spot which would prohibit proper shoulder contact, ultimately resulting in a washout or wobble failure.

FIGURE 53—A flat file is used to repair the damage. The file must be held parallel to the shoulder face, and metal removal confined strictly to the "high spot."

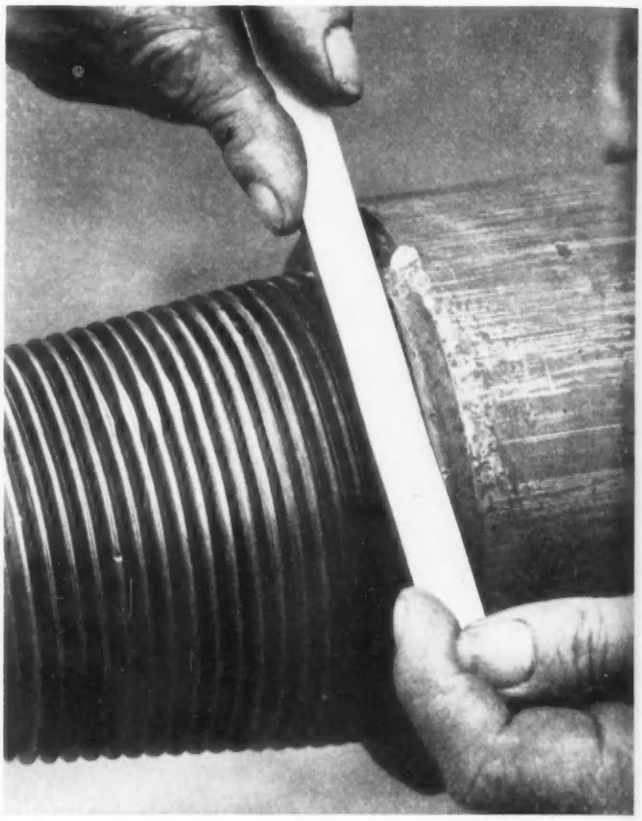


FIGURE 54—Repaired area being checked for flatness. Note that straight edge contacts all areas of the shoulder indicating high spot has been removed and no radial gouges across the face exist to permit leakage or improper engagement.

FIGURE 55—Notice the mashed pin threads in this photograph. These threads must be repaired, or serious trouble will result.

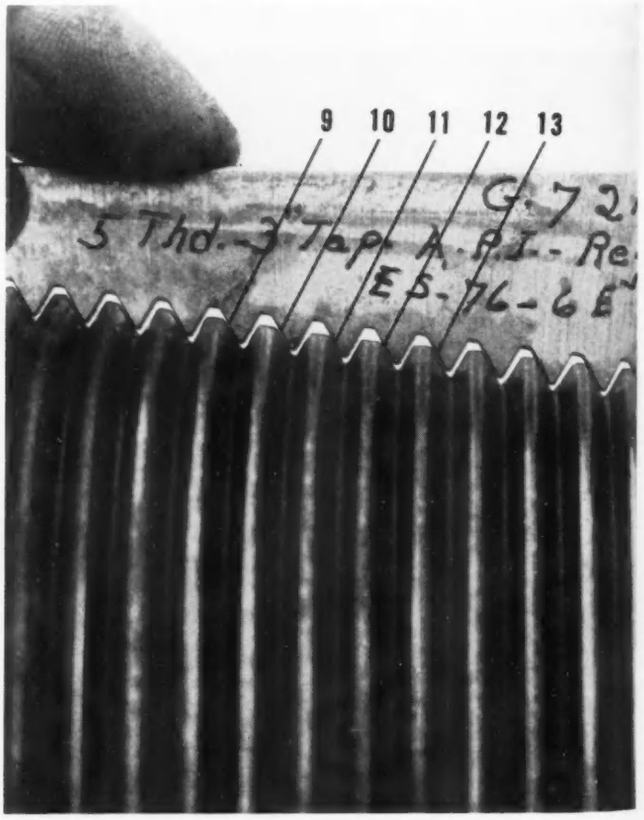
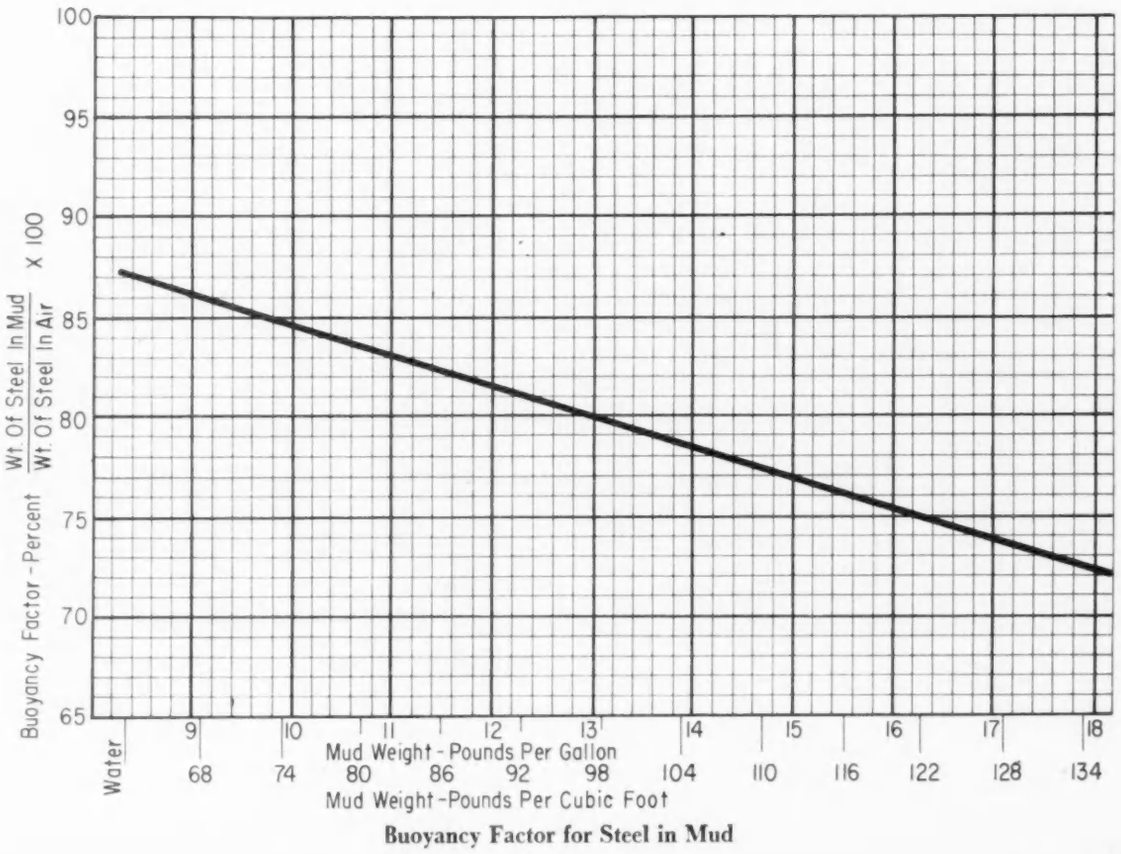


FIGURE 56—Here, a thread profile gage shows the reason damage must be repaired. Flanks of damaged threads (9, 10, 11, 12 and 13) hold profile gage out of proper contact with other threads. If unrepaired, this would cause thread galls, a loose connection and consequent washout or wobble failure.

FIGURE 57—A triangular file is used to remove metal from high spots on the flanks of the damaged threads. Extreme care must be exercised to restore the original contour of the flanks.

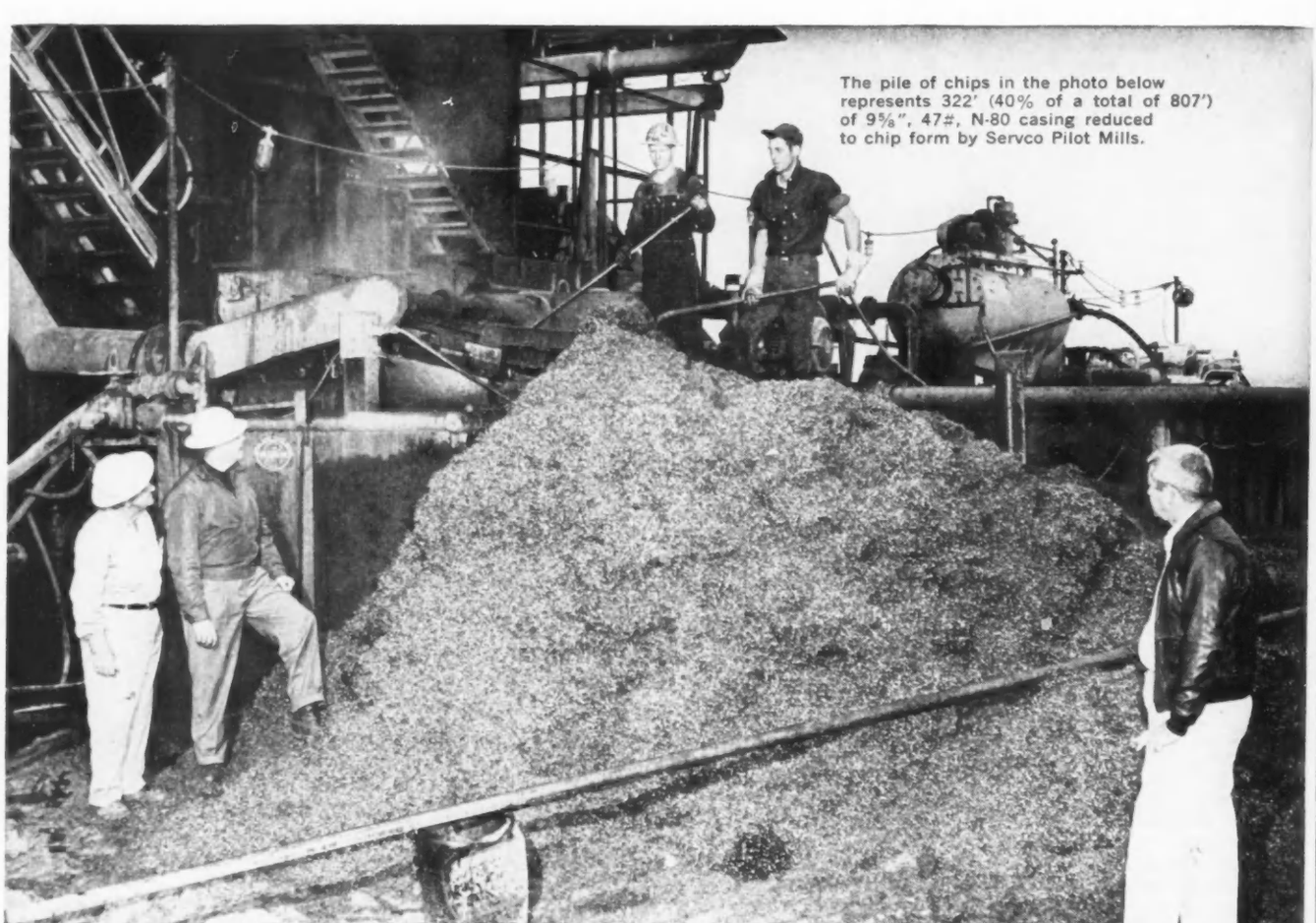
FIGURE 58—The thread profile gage shows the contour of correctly repaired threads. Notice that the gage fits all threads correctly, even though the crests of the damaged threads are lower than standard. This repaired pin is ready for another long period of trouble-free service.

Appendix 4



Buoyancy Factor for Steel in Mud

—The End



The pile of chips in the photo below represents 322′ (40% of a total of 807′) of 9⅝″, 47#, N-80 casing reduced to chip form by Servco Pilot Mills.

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A-Z International Tool Company

A-Z Packer Retriever is an advanced, simplified design with a positive action holding mechanism which makes this the fastest and safest in use today. The combination of a true rotary mill with simplified design of the setting and releasing mechanism prevents wedging of the shoe, eliminates any possibility of dropping the packer once the tool has passed thru the packer and allows the tool to be set, released and reset down hole as many times as necessary to complete the job. This tool is manufactured from heat treated alloy steel, both the rotary mill and the bit are dressed with ZITCO, A-Z's fragmented tungsten carbide cutting material. For complete safety, all connections on the Packer Retriever are locked to prevent backing off.

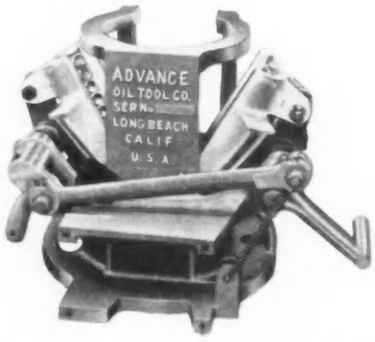
For more data on above item, circle E1 on postcard, Page 243

Abegg & Reinhold Company

VARCO Type SDXL "Extra Long" Slips provide full length support to the gripping dies. New body design has a buttress type structure enabling it to withstand the heaviest axial and transverse loads. This extra long slip is made for hook loads approaching and exceeding 250,000 pounds, and it is ideally suited for use with VARCO type KMPC units or VARCO type MSS master bushings with round trip bowls. Type SDXL slips are available for 5, 4½, and 3½-inch drill pipe.

For more data on above item, circle E2 on postcard, Page 243

Advance Oil Tool Company



Hand Operated Model "C" (4-Inch Size) Spider for use by three-man drilling crews on drill pipe up to and including 4½-inch OD. It rests on a rotary table adapter plate. The slips are raised or lowered by means of a lever operated by the floor man. If at any time it is desired to convert the spider to power operation, either air or hydraulic, this can be done easily by installing a cylinder, valve and hoses.

For more data on above item, circle E3 on postcard, Page 243

Aeroquip Corporation

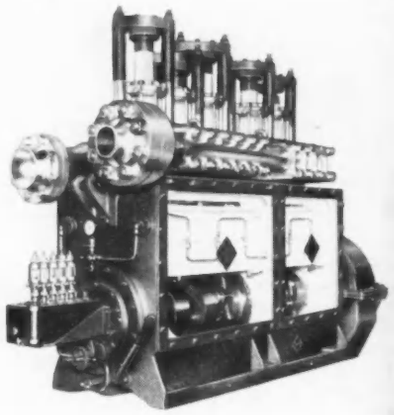
675 Hose, for 3,500 psi penumatic systems, features a Teflon tube and two-ply stainless steel wire braid reinforcement. With the exception of pressure requirements, it has the same characteristics of the 678 Hose and other Aeroquip Hoses of Teflon. It is available in sizes 4 (¼-inch) to 12 (¾-inch), and fittings are of the reusable "super gem" type.

For more data on above item, circle E4 on postcard, Page 243

678 Hose of Teflon for 6,000 psi pneumatic systems and with a 24,000 psi burst pressure, is an extremely rugged hose designed for the more severe requirements of missile pneumatic charging systems. The 4 to 1 safety factor provides greater safety to crews handling very high pressure air, helium, nitrogen, and other gases. Teflon tube with zero moisture absorption and anti-adhesive surface permits fast, easy purging and dehydration of hose lines and equipment. Spirally-wound stainless steel wire over-laying a stainless inner braid reinforces the hose, which has a stainless braided cover. The hose is sturdily constructed for use under rough handling, and yet retains great flexibility making it easy to handle and coil on reels. It is now available in —6 (⅜-inch) and in —8 (½-inch) sizes. New Segmented Fittings for 678 Hose are reusable and incorporate a proven lip-seal for permanent leakproof performance.

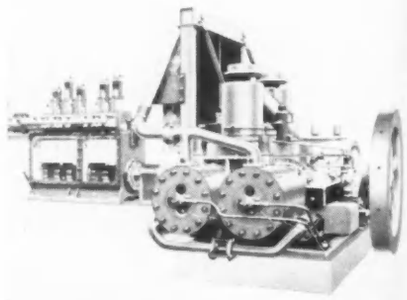
For more data on above item, circle E5 on postcard, Page 243

Ajax Iron Works



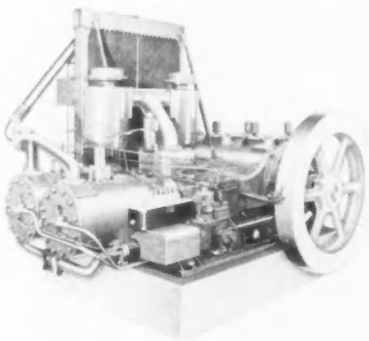
QPA-5,000 Series Quintuplex Pump, designed primarily for use in secondary oil-recovery operations, has a 5-inch stroke with plungers ranging from 1½ to 3¾-inches in diameter. It is designed for continuous service capable of 230 bhp when operating at 360 rpm. Capacity has been rated up to 14,700 barrels of fluid per day at 825 psi. Pressure rating extends to 5,150 psi, meeting the most extreme requirements in most waterflood operations.

For more data on above item, circle E6 on postcard, Page 243



QPQ-5,000 Series Quintuplex Pump and DP-230 Gas Engine operating as a coupled team.

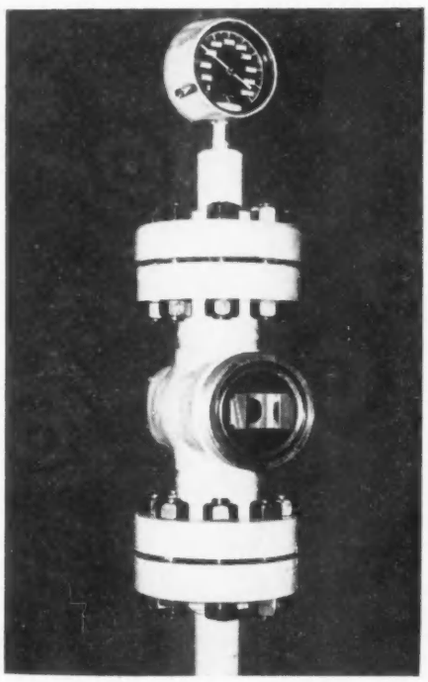
For more data on above item, circle E7 on postcard, Page 243



DP-230 Horizontal, Twin Cylinder, Two Cycle Gas Engine has a 13¼-inch bore and a 16-inch stroke. It will develop 230 bhp while operating at 360 rpm. Engine is designed to match input horsepower of the Ajax QPQ-5,000 Series Quintuplex pumps.

For more data on above item, circle E8 on posacard, Page 243

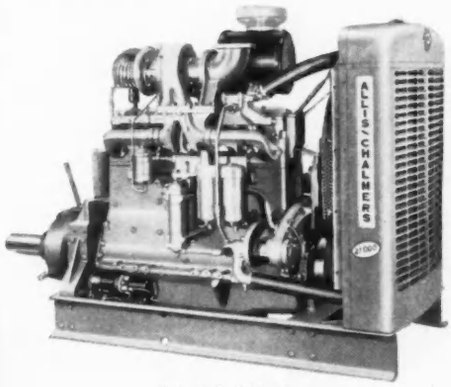
Alco Products, Inc.



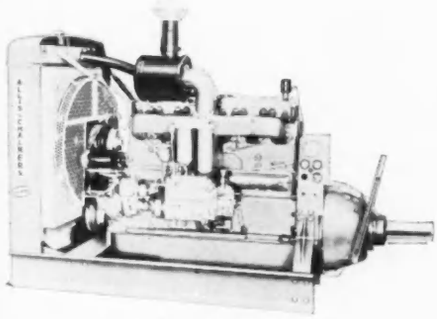
"Flo-Seal" Valve seals positively with line pressure and cuts wear and sanding problems. The new through-conduit gate valve uses line pressure to maintain a tight metal-to-metal seal between the floating seats and gate. Thus the valve stays tight as long as pressure is maintained. The valve has full-bore, through-conduit design and offers no restrictions to flow. Installation can be made with pressure on either side. Seats are self-aligning and automatically compensate for distortion caused by temperature changes, pressure changes, and wear. Two "O" rings prevent foreign matter from obstructing free action of the piston. When body pressures exceed line pressures because of high ambient temperatures, the upstream valve seat is forced open and excessive pressures are bled back into the line. The corrosive- and erosive-resistant, alloy-steel valve seats and gate seldom need replacement; but when necessary, replacement can be made quickly and easily with a screwdriver. Each part is precision-machined for fast installation and full interchangeability. The valve is recommended for both christmas tree and flow line service.

For more data on above item, circle E9 on postcard, Page 243

Allis-Chalmers Manufacturing Company



Model 21000



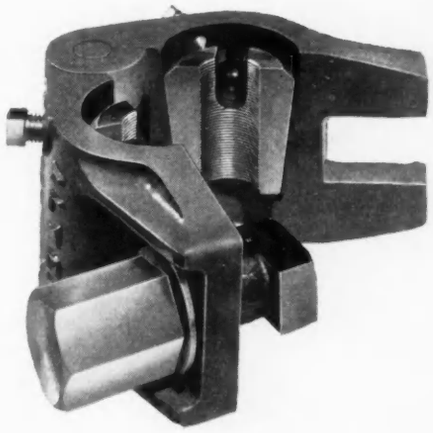
Model 16000

340 and 230 Horsepower Diesel Engines, Models 21000 and 16000 are the most economical, cleanest-running and fastest-starting diesels in their class. The turbocharged 21000 and the naturally aspirated 16000 are ideal for powering drilling rigs, rotary tables and mud pumps. These engines deliver much more working horsepower, and do it with substantially less fuel and lube oil.

For more data on above item, circle E10 on postcard, Page 243

Alten Foundry and Machine Works, Inc.

Alten Wonbolt Neverslip Polished Rod Clamp is designed to make well spacing safer and easier. Tested to over 250,000 pounds without slipping. A self-tightening feature enables it to hold several times any known sucker rod load when tightened only hand tight. Can be permanently installed with small adjustable wrench. Only one clamp is needed for service work, since changing the slips will make it fit any polished rod. Clamp is guaranteed in writing to hold any well.



For more data on above item, circle E11 on postcard, Page 243

Alten-Loomis Super Clipper Model 32 is available for shallow well drilling and clean out work. Features include: Four speed transmission with reverse. Telescoping mast that will support three times the 22,000 pound rated pull, without aid of guy wires. Anti-friction bearings throughout. Extra sturdy casing-reel. Swiveling pitman and tapered crank pin for quick stroke changes. Variable stroke lengths from 18-inch to 38-inch. Excels in clean outs and workovers to 2,000 feet. Larger sizes will be available in near future.

For more data on above item, circle E12 on postcard, Page 243

Alten Safety-Pak Stuffing Box is designed so lubricant is forced directly into center of packing where wear and friction occur, resulting in greatly increased packing and rod life. Packing is easily and safely replaced by removing the split top completely. Danger of top falling on fingers is thus eliminated. Stuffing Box is small enough to be used on most dual completion wells without sacrificing strength. Load tested in excess of 100,000 pounds with a working pressure of 1,500 psi. Total height when packed and threaded only 6⅝ inches. Diameter 3¾ inches.

For more data on above item, circle E13 on postcard, Page 243

American Coldset Corporation

Jet Blade Diamond Bit, using replaceable jet nozzles, offers outstanding service in hard and cherty formations. Has less torque than a standard diamond drilling bit and less pressure is required to obtain necessary drilling weight. Due to the bi-center principle, this bit can go in and out of holes without having to ream or get stuck in a tight hole. Blade type bits can also cut a one-inch core which in many cases is circulated to the surface and recovered on the shale shaker, a desirable feature for the geological information contained. These bits also have tendency to straighten up any deviation that a hole might have. Also, jet blade contains approximately 3/5 of the carat weight of a standard diamond drilling bit. Couple this with a higher salvage return due to reduced torque and pressure, it all adds to reduced cost per foot.

For more data on above item, circle E14 on postcard, Page 243

American Cyanamid Company

Cyamon S Blasting Agent and Cyamon S. Primer are two new explosives developed for use in seismograph exploration. New blasting agent is a nitro-carbo-nitrate that requires a primer for detonation. Packaged in hermetically sealed cylindrical containers, Cyamon S blasting agent has a moderate to high degree of resistance to water pressure and stands up well during storage. Each can shown here is threaded to permit easy coupling for the forming of column loads. Depending on column length of charge and practice of seismic "shooter," occasional booster primers may be added. Cyamon S primer can be coupled to blasting agent through threaded connections of its cylindrical metal package. Female end contains a recessed well for cap insertion that will accommodate any seismic cap now available. Blasting agent is supplied in 2-inch x 1 pound and 2½-inch x 1 pound blue metal containers. Primer is packaged in red metal containers in the 2-inch x 1 pound and 2½-inch x 1 pound size.

For more data on above item, circle E15 on postcard, Page 243

Ansul Chemical Company

Ansul 350-Pound Wheeled Dry Chemical Fire Extinguisher has the highest rating ever granted a fire extinguisher by Underwriters' Laboratories—160-B:C. A novice using extinguisher for the first time should be able to put out a standard gasoline pan fire 160 square feet in area. During testing, standard gasoline fires of 400 square feet were consistently put out by UL experts in 11 seconds. The new rating was given as a result of greatly increased effectiveness due to new design features which increase flow rate and improve distribution of dry chemical in the stream pattern. Extinguisher was developed to protect from hazards connected with high speed transfer of gasoline and other flammable liquids in fueling and pipe line operations.

For more data on above item, circle E16 on postcard, Page 243

Antara Chemicals, Division General Aniline & Film Corp.

GAFEN FA-1, FA-5 Foaming Agents for Air (Mist) Drilling permit the continuation of air or gas drilling in the presence of moderate water intrusion. By injecting solutions of these products into the compressed air or gas being introduced into the hole, produced water is converted into foam or mist in which cuttings are dispersed and suspended. Thus gumming and balling of cuttings are minimized. Gafen FA-1 should be used where flows (up to 100 bb/hr) of fresh or moderately saline water are encountered. Gafen F-5 is designed to handle flows of highly concentrated salt water.

For more data on above item, circle E17 on postcard, Page 243

Aqueness Department, Atlas Powder Company

Afrox 200 is a new foaming agent formulated for air or gas drilling in areas troubled with salt water invasion. It turns even saturated salt water with up to 10 percent oil contamination into

aerated foam in which cuttings are dispersed and suspended. The light column of foam is easily lifted out of the hole with normal pressures. Salt water influx of as much as 50-60 barrels per hour can be handled.

Afrox 100 is a new designation for standard fresh water foaming agent previously designated as Afrox.

For more data on above item, circle E18 on postcard, Page 243

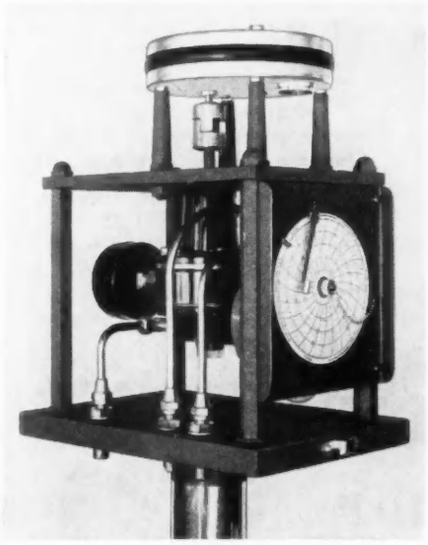
Arbeitsgemeinschaft AEG-MAN Pleuger

Pleuger Rodless, Reciprocating, Diaphragm Oil Well Pumps are available with rated capacities of 60-120 barrels per day. The 9-foot x 5⅜-inch OD unit is equipped with a three-phase 60 cycle AC electric motor with power furnished through an oil resistant four wire special cable fastened to the tubing string. Power requirements are reduced since sucker rod friction is eliminated and prime mover is located at the pump. Wear is negligible since produced fluids contact only the diaphragm and suction and discharge valves. Filter type intake prevents most solids from reaching pump interior. An interior separating tube prevents fine material from settling on discharge valve. Pump delivery can be controlled up to 30 percent rated capacity by means of frequency changer.

For more data on above item, circle E19 on postcard, Page 243

Arco Instrument Company, Inc.

ARCO Model M-R Continuous Gas Sampler, for accurate determination of chemical and physical properties of gas, will over a period of seven days, accumulate at constant rate a sample of gas to final pressure at or near 140 psig from the sample source—minimum pressure of which is not less than 160 psig.



It is supplied with mechanical drive, includes pressure recorder in single case, and is available for sample ranges up to 150 psig when required. However, instrument can be furnished for lower pressure samples. Design is based on principle that maintenance of constant rate of increase is accomplished by regulation system equipped with precision driving mechanism. Gas sample is gathered in portable container for easy access to the laboratory. Instrument can be employed in any hazardous area where vapor proof equipment is required because it needs no external source of power.

For more data on above item, circle E20 on postcard, Page 243

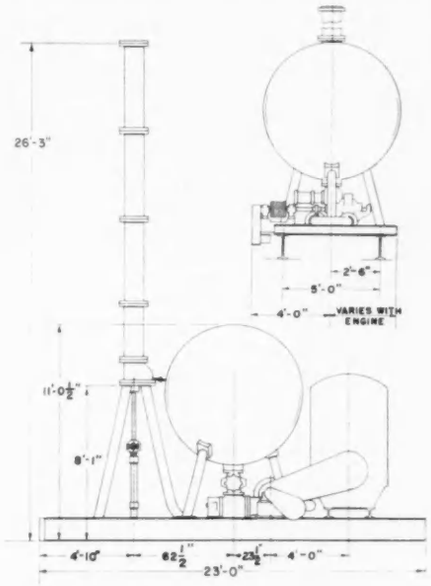
Atlas Pipe, Inc., Division Atlas Bradford Company

Atlas Pipe "Compact" Integral Joint Tubing Connection is designed for slim hole or multiple completions in shallow to medium depth holes. Tubing connection is available in sizes 1.315-inch OD through 3.5-inch OD, and in Standard API Seamless Grade J-55 and N-80 as well as light wall ERW tubing in SPA-J Grade. Features include: (1) Threads are recessed for durability and interchangeability with Standard API 10-round threads and are usable with standard connections and fittings. (2) Laboratory tests show joint efficiency is well above calculated theoreticals. (3) Full bore joint permits easy passage of wire line tools and swabs. (4) All material is manufactured to conform with the applicable parts of API Standards 5A.

For more data on above item, circle E21 on postcard, Page 243

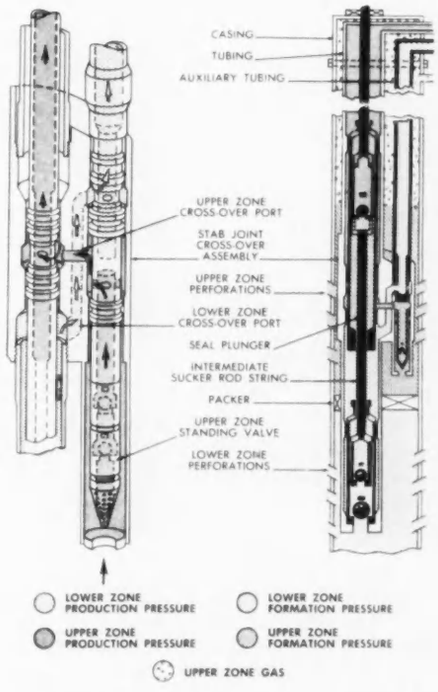
Axelson Division of U.S. Industries, Inc.

156-Inch Counter-Balanced Hydraulic Pumping Unit is ideally suited for deep production, water flood and two-zone applications where large amounts of fluid must be produced. Unit is complete with cooler, by-pass filter, full flow filter, slide rails and tie-down, polished rod sub-coupling, belts and sheaves. Features include. (1) Higher rod stress. (2) Long smooth strokes. (3) Cushioned reversals. (4) Less bottom hole turbulence. (5) Longer sucker rod life. Specifications: Polished rod load, 32,000 pounds; effec-



tive counterbalance, 76 percent; polished rod travel (nominal), 13 feet; maximum load range, 16,000 pounds; cycle rate (maximum), 12 CPM; system fluid, 230 gallons; gross shipping weight (less engine), 21,000 pounds.

For more data on above item, circle E22 on postcard, Page 243



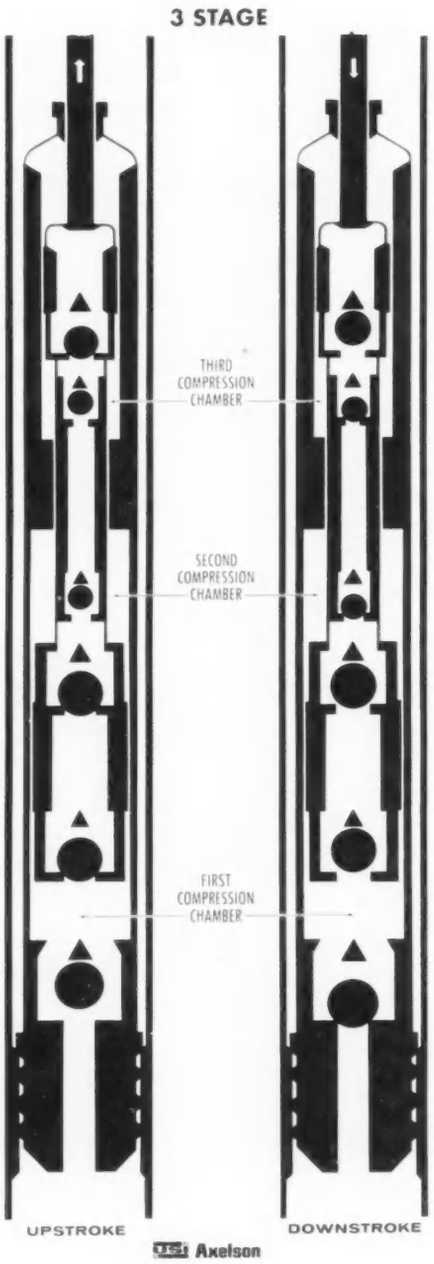
Long Stroke Two-Zone Pump can be installed under the Axelson 26½-foot hydraulic pumping unit for maximum production. A single or double upper zone standing valve can be run on the auxillary tubing. This short string of

tubing is easily positioned and sealed automatically. Valves used are Standard API cages. Provides oversize standing valves for the upper zone pump. Features: (1). Upper zone standing valves can be retrieved without disturbing the packer, main tubing string. Upper and lower zone pumps simply by removing auxillary tubing. (2). Sealing surfaces subject to wear are metal to metal. All wearing surfaces are standard pump stock items. (3). Seals used in cross-over asemblies are standard API "O" cups. (4). Production from lower zone is conducted up through the lower zone cross-over port into the auxillary tubing. Production from the upper zone is conducted through the upper zone standing valves and crossed over to the main tubing string through the upper zone cross-over port and then conducted up the main tubing string. Pump is available for 5½-inch casing and 6⅝-inch casing.

For more data on above item, circle E23 on postcard, Page 243

36-Inch Stroke Hydrax Surface Hydraulic Pumping Unit is ideal for wells having a sand problem where the slow upstroke will reduce amount of sand drawn into sub-surface pump. It will produce wells from stripper category to those requiring over 100 barrels per day, depending on depth and pump bore. The unit includes a direct drive electric motor or a Vee-belt drive for internal combustion engines and is available in 3,500 and 5,000-pound polished rod load capacities. Various power package combinations are available with different size power pumps for obtaining cycle rates suitable for varied pumping conditions. Features include: (1). Mounts directly on tubing nipple, no foundation required. (2). Only one valve, requiring adjustment for down stroke speed only. (3). Vertical reservoir, mounted on wellhead provides more area for cooling, as well as separating the unit and wellhead polished rods—hydraulic oil is not contaminated. (4). External filter for ease of maintenance.

For more data on above item, circle E24 on postcard, Page 243



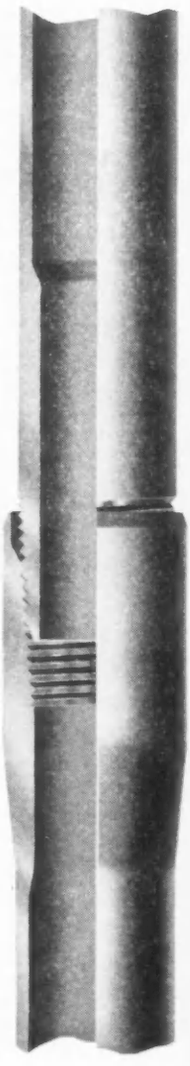
Three-Stage Pump for producing high gas-oil ratio wells. It has proved highly successful in producing wells where gas lock may have prevented normal pump operation. The new pump is similar to the Axelson two-stage pump, with the exception of an additional compression chamber. The third-stage addition offers the following features: (1). A higher compression ratio. (2). Builds in a good compression ratio at the bottom of the stroke for the important first and third stages. (3). Compression can be controlled by selection of component part lengths, so at the bottom of the stroke there is a minimum of volume in the first and third stages. (4). Simplicity of spacing.

For more data on above item, circle E25 on postcard, Page 243

Aztec Manufacturing Company

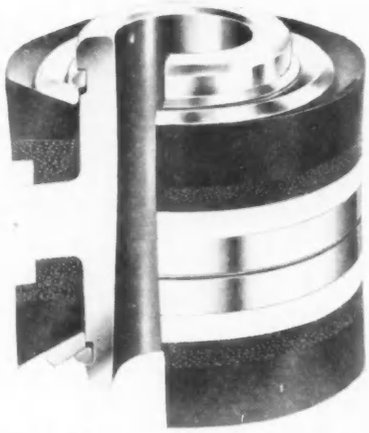
Slim Hole Tubing with "I-J" (Integral Joint) can be threaded in tubing sizes of 1-inch through 2⅞-inch, including 2 1/16-inch. This new type joint saves cost for slim hole and multiple completions in shallow and medium depth wells. The box and pin integral joint embodies the use of 10 round threads, and is interchangeable with API non-upset tubing and fittings.

For more data on above item, circle E26 on postcard, Page 243



B.A.L. Limited

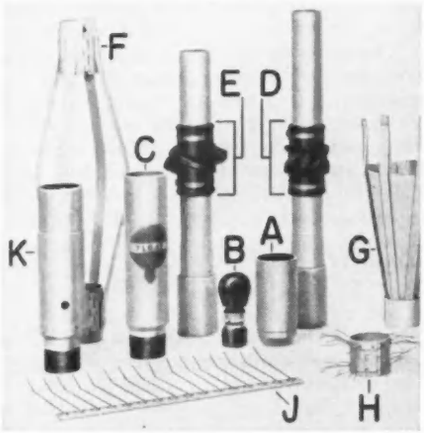
Polypac "Super" Slush Pump Assembly, designed for high pressures, has an annular recess in the "heel" of the piston rubbers into which a nylon wear resisting anti-extrusion ring is fitted. During the pressure stroke, the rubber is compressed, expanding the simi-rigid nylon ring to the wall of the liner, thus blanking off the clearance between liner and piston flange and providing perfect con-



tainment of the rubber. The result is an almost complete absence of extrusion, less wear on the piston flange and at least one third longer life for the piston assembly, even under the highest pressures.

For more data on above item, circle E27 on postcard, Page 243

Baker Oil Tools, Inc.



Baker Full-Flow Tubing Guide Shoe (A above) can be made full-opening by pumping a ball to the shoe and applying pressure to shear guide out of shoe. Shoe is usually run with full-flow tubing fill-up collar (not shown) with cementing plug, which contains a drillable baffle plate that acts as a plug seat for the cementing and back-pressure plug (B).

For more data on above item, circle E28 on postcard, Page 243

Tubing Cement Float Collar (C) utilizes Baker ball-type back-pressure valve for floating and cementing just as a regular float collar does in conventional casing strings.

For more data on above item, circle E29 on postcard, Page 243

Turbulizer (D) reduces channeling when cementing multiple tubingless completions by spacing the tubing strings apart so that cement will flow evenly around each tubing string (a larger OD version (E) for use on single strings is available).

For more data on above item, circle E30 on postcard, Page 243

Tubing Centralizer (F) centers the tubing to provide a uniform cementing space.

For more data on above item, circle E31 on postcard, Page 243

Metal Petal Basket (G) serves as a bridge during cementing jobs to protect lower formations.

For more data on above item, circle E32 on postcard, Page 243

Retrievable Tubing Bridge Plug (L), for remedial and stimulation work, is a dependable, leakproof, yet retrievable plug that can hold pressure from either above or below. It may be used either alone or as a straddle tool in conjunction with Retrievable Casing Packer (M), a set-down packer that has an integral long-stroke circulation joint and is available in both single-grip and double-grip versions as a squeeze tool or production packer.

For more data on above item, circle E33 on postcard, Page 243

Wall Scratcher (H), available with either 2 ½ or 4 ½-inch wires, provides maximum removal of mud cake from the wall of the hole in area to be cemented, with minimum removal of mud while running in. Rotating-type wall scratcher (J) is also available.

For more data on above item, circle E34 on postcard, Page 243

"TC" Stage Cementing Collar (K), which consists of only two pieces and is operated entirely by rotation, makes stage cementing operations possible in tubingless completions. Primary Cementing Equipment not illustrated includes Baker Tubing Cement Float Shoe, the Tubing Cement Guide Shoe and the Baker Triplex Cementing Shoe.

For more data on above item, circle E35 on postcard, Page 243

Wire Line Bridge Plug (N), similar in design to the popular conventional-size bridge plug, is completely drillable and is set by Wire Line Pressure Actuator (P).

For more data on above item, circle E36 on postcard, Page 243

Retainer Production Packer (R), based on the design of the conventional-size Baker Retainer Production Packer and features, for tubingless completions, the same versatile, high-performance qualities. The Locator Seal Nipple (S), which is made up on the bottom of the tubing string, seats in the packer sealing bore, providing a leak-proof seal. Not illustrated but available for completion and production work are the Baker Invertible Packer, which may be run either as a set-down or a tension packer; Baker Casing Pump Packer, which performs dual function of anchoring the pump and packing off the casing, and the Tension Tubing Anchor, which eliminates breathing and buckling by securely anchoring tubing string after it has been placed in proper tension from the surface.

For more data on above item, circle E37 on postcard, Page 243

Tubing Scraper (T) has a new design to provide more cutting edge and more coverage, and the spiral design provides a track through which the cuttings and scrapings may be washed up.

For more data on above item, circle E38 on postcard, Page 243

Insert Float-Check Valve

Insert-Type Fill-up and Flowing Equipment (for installation between pin ends in a made-up joint) for primary cementing in shallow and moderate

Insert Flexifill Valve

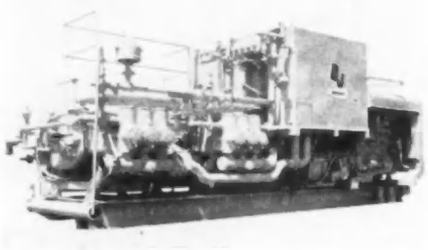
depth wells, are completely drillable and feature a specially designed valve-to coupling seal that holds pressure from either direction and adapts to fit a wide range of made-up pin-to-pin distances. Baker Insert Float-Check Valve employs a ball-type back-pressure valve for floating and cementing. **Baker Insert Flexifill Valve** incorporates the same automatic self-adjusting flow control diaphragm used in Baker Flexiflow Equipment, to provide controlled bottom fill for relief from pressure surges and prevent overflow of the casing. When casing is on bottom, a ball is pumped through the diaphragm to act as back-pressure valve for the cementing operation.

For more data on above item, circle E39 on postcard, Page 243

Model "R" Single-Grip (Double-Grip) Retrievable Casing Packer, with a 30-inch stroke circulation control unit, is used for either production or pressuring operations, and is especially suited for high temperature and pressure applications. The double-grip version features a hydraulic button-type tubing hold-down to withstand high pressure differentials from below the packer. During running and retrieving operations, the buttons are vented by circulation control unit to prevent pressure from forcing them out against the casing. Circulation control unit is automatically closed to seal off vents in the hold-down when set-down weight is applied to set the packer.

For more data on above item, circle E40 on postcard, Page 243

BJ Service, Inc.



Model 1020 High Pressure Cementer doubles as a fracturing and high pressure pumping unit. It is available for sale or lease outside the U.S.A. All operating controls and gages are located at a central control panel near the displacement tank. Valves are manually controlled with the exception of those on the tank suction, which are air operated. Unit may be equipped with either BJ, Gardner-Denver or Oil Well triplex plunger pumps, each of which is powered by a 335 horsepower Cummins NRTO-6 diesel engine. With 4½-inch plungers, the unit pumps 960 gallons per minute at 0 psi and 100 gallons per minute at 8,000 psi. With 4-inch plungers, it pumps 100 gallons per minute at 10,000 psi and 790 gallons per minute at 0 psi. The 1020 can mix and introduce into the well from 30 to 35 sacks of 120 pound slurry per minute.

For more data on above item, circle E41 on postcard, Page 243

Baroid Division of National Lead Company

Baroid ppm Log provides an entirely new concept in analysis of drilling mud for hydrocarbons. For the first time, an accurate quantitative analysis of drilling mud for its total hydrocarbon content is possible. The reliable Baroid Gas Chromatograph has been teamed with the new Baroid Steam Still so that all hydrocarbons in the mud—methane, ethane, propane, butane, and pentane plus—can be reported in parts per million of mud volume. The ppg Log is available as a part of the regular Baroid Log on manned well-logging equipment or as a precise off-location service through use of sample bottles which can be mailed to the Baroid Laboratories in Houston, Texas.

For more data on above item, circle E42 on postcard, Page 243

X-Cor is a film forming corrosion inhibitor for addition to drilling and packer fluids to protect the drill pipe, casing and tubing from hydrogen sulfide attack, oxidation, or the effects of electrolytes. X-Cor protects metal surfaces from corrosion and reduces dispersion of cuttings or formation wall into the drilling fluid. It is chemically stable and performance is not affected by calcium or chloride contaminants. It has a low pour point and is easily removed from containers at low temperatures. Non-flouresecing. Compatible with all water-base drilling fluids now in common use.

For more data on above item, circle E43 on postcard, Page 243

Petrotone is a specially processed organophilic, clay-like material that increases the suspending properties of crude or refined oils, oil-base mud and oil-base-emulsions (invert emulsions). In oil-base and oil-base muds the problem of adequately suspending weight material, without excessive mud-viscosity, has always been a deterrent to widespread use of these muds. Petrotone is designed to overcome this problem and eliminates the settling of solids in oil-base and oil-base-emulsion muds, thus permitting the safe, economical use of weighted mud.

For more data on above item, circle E44 on postcard, Page 243

Duratone Synthetic Organophilic Colloid in Dry Powder Form is used primarily as a filtration control agent for oil-base mud systems that contain water. The water may be present as a contaminant (in concentrations as low as 5 to 10 percent by volume) or as a component of an oil-base emulsion mud. Duratone has the unique property of controlling filtration rates at temperatures above 250° F. as well as at lower temperatures. Low, all oil filtrates have been obtained at 400° F. It also improves the ability of oil-base emulsions to suspend weighting materials, and may also be used to adjust the flow properties of oil-base emulsion muds. Duratone treated oil-base emulsion muds are recommended for workovers, completions, coring and drilling, wherever an oil-base mud would have application, and may be spotted in the hole or used as a complete mud system.

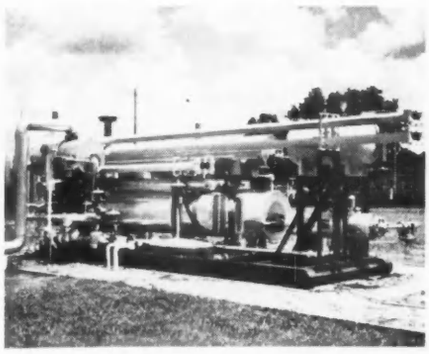
For more data on above item, circle E45 on postcard, Page 243

Barton Instrument Corporation

Model 202A Flow Recorder accurately measures and records static and differential pressure on a standard 12-inch round chart. Unit features a lower price than the 202, plus several design changes in recorder case and linkages. Actuating unit is the Barton 199 rupture-proof meter body, assuring maximum dependability. Although Recorder is primarily intended for measurement of differential pressures, provision is made for addition of two or more pens for recording of temperature and static pressure. It is available with either the Barton or the Foxboro time arc.

For more data on above item, circle E46 on postcard, Page 243

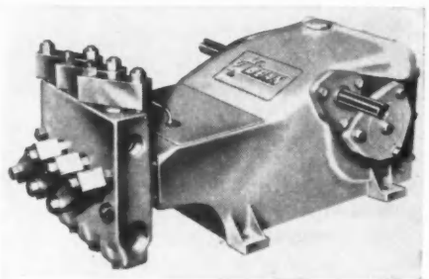
J. B. Beaird Company Inc.



Beaird Belex Fully Packaged Condensate Recovery Unit, with a compression refrigeration cycle, is ideally suited for optimum condensate recovery of wet gas streams. The basic unit consists of three skid mounted packages: (1). The chiller, completely piped, insulated and aluminum jacketed. (2). Compressors with drive and refrigerant interstage air cooler. (3). Water cooling towers with drive. Shop assembly, pre-engineering and packaging offers the following economic features: Low initial cost and quick payout. Lowest possible field labor costs for assembly. Optimum condensate recovery. No glycol recovery system. 100 per cent salvable when moved to new location. Unit can be operated or restored to service by production personnel without specialized training. Automation of key functions permits unattended operation except for routine checking. They are available for off-the-shelf delivery.

For more data on above item, circle E47 on postcard, Page 243

John Bean Division of Food Machinery and Chemical Corp.



7000 Series Compact Outside-Packed Triplex Pump has a 50 percent increase in gpm displacement on each size at no additional cost. Has rated capacity of 1 to 90 gpm at operating pressures from 100 to 10,000 psi. These increases are made possible by a re-designed fluid end which permits greater capacity without increasing present operating conditions such as NPSH, and suction acceleration head characteristics. Features include: Low suction manifolding, natural up-and-down motion of valves, low center of gravity which reduces operational vibration, individually removable cylinder and valve covers simplify the maintenance man's job. Fluid temperatures up to 500° F. can be handled. Pumps can be used in handling caustic solutions, corrosive chemicals, viscous liquids, fatty acids, hot and cold oils, solvents, chemicals, petroleum products, and salt water for industrial or other purposes. A selection of construction materials are offered for parts on fluid end of pumps.

For more data on above item, circle E48 on postcard, Page 243

Bell Corporation

B-K Pit Volume Totalizer is an indicating and warning device for complete and accurate check of mud volume. Completely pneumatic, it is easily installed and calibrated for use on any type or size of mud tank, and in no way interferes with normal operation. It indicates total barrels of usable mud in pits and gives complete protection by warning of pending blow outs, water and gas flows, lost circulation, and gas kicks by indicating changes in mud volume at all times. The recording device provides a 24-hour chart of variations in mud volume and a device to warn the crew when loss or gain limits are reached. It can be set for any unit of volumetric measure and will record a readable gain or loss of 3 barrels. With Vernier attachment, gains or losses of 1 barrel can be read. Warning device can be set to indicate gains or losses as small as 5 barrels. By carefully observing the chart, the driller can pre-estimate volume of gas kick 30 minutes ahead of time.

For more data on above item, circle E49 on postcard, Page 243

Bell Helicopter Company

Bell Model 47G-2 Trooper is a three-place utility helicopter which has proven itself invaluable in every phase of exploration, drilling and production of oil. On shore, the Trooper frequently is the only type of transportation that can operate independently in isolated, hard to reach places. Off shore the versatile helicopter cuts transportation problems by handling crew changes, emergency repair trips—and provides fast, efficient travel for key supervisory personnel. In addition to the Model 47G-2, Bell markets a three-place hot weather, high altitude performance helicopter and a four-place utility machine.

For more data on above item, circle E50 on postcard, Page 243

Bell Rubber Company

Bell Strip-Master Hydraulically Operated Wire Line Oil Saver provides greater safety for wire line operations, is designed for easy and fast operation and fast operation maintenance. Packing can be changed simply by unscrewing the top nut. No lines have to be disconnected. Indicator at the hand pump tells packing condition so the operator can change packing before it wears out. Hydraulic action compresses cylindrical packing tightly around the line. Two models of Strip-Master: Model HR passes 1¾-inch rope socket and sinder bar; Model HL clears 2-inch tubing swab and cups. Strip-Master can save time as it does away with need to break out the oil saver to replace swabbing cups.

For more data on above item, circle E52 on postcard, Page 243

For more data on above item, circle E51 on postcard, Page 243

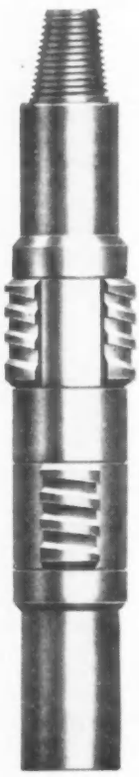
Aluminum Tubing Swabs with Shear Pins have aluminum body with a fishing neck for possible recovery. Swab shears off instead of breaking line and goes into acid disintegration if lost in the hole. The 1½-inch size shears at 8,000 pounds and the 2 and 2½-inch swab shear at 10,000 pounds. Swabs feature a choice of cups: Reversible, SE type, all rubber multi-rib, undersize reversible.

EQUIPMENT PROGRESS—1960

D. M. Best Company

Best OILTOOL Saver Subs are available for use with all oil well tubing during completions, workovers, and operations where tubing is utilized in place of other work pipe. The subs are made from finest alloy steel, properly heat treated. Threads are precision cut API or special. Parkerized finish is applied to each sub for proper break-in. Features: (1) Eliminates tubing thread wear. (2) Puts wear on the saver sub in place of the pipe. (3) Saves drill pipe wear and tear, and rental cost. (4) Eliminates hauling charges for drill pipe. (5) In addition, small, fast rigs may be used.

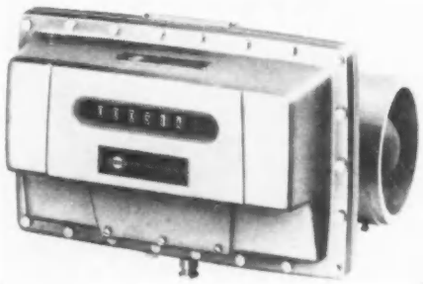
For more data on above item, circle E53 on postcard, Page 243



Best OILTOOL Casing Scrapers remove all mill scale, burrs, cement sheath, mud cake, and any foreign matter from the inside of the casing, providing a perfectly smooth and clean surface for proper seating of packers, and for proper clearance for all tools run into the casing. Each casing size has a scraping range of all weights in that size and each tool size will accommodate several casing sizes, thus giving the greatest possible coverage with the least number of tools. One size is now available for scraping 2⅞-inch API oil well tubing used in tubingless completions. Each tool is parco and cadmium plated and painted to eliminate rust and corrosion.

For more data on above item, circle E54 on postcard, Page 243

Black, Sivalls & Bryson, Inc.



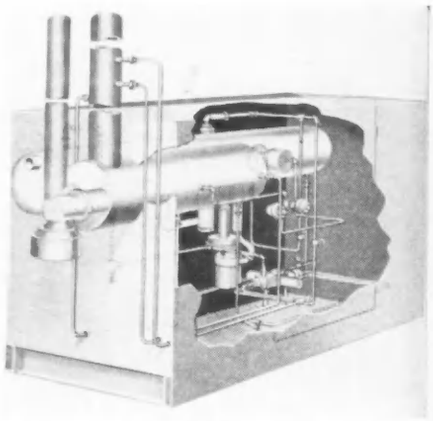
Gyro Integrated Mass Flowmeter measures fluid mass by the pound. No compensatory devices are necessary for measuring or recording variants which affect volumetric meters. Supercompressability and variant flow temperatures and pressures do not affect fluid mass. Accuracy is plus or minus 1 percent. Repeatability is plus or minus ¼ percent. Meter readout is immediate. The fluid enters meter housing and passes through the tubes of an impeller and turbine. The impeller is driven at constant speed. This imparts constant angular velocity to the fluid. The turbine downstream of impeller is restrained from turning. In doing so, a torque is imposed on it which is proportional to the mass rate of flow. This torque is transmitted to a gyro. The gyro precesses or rotates about its axis at a rate proportional to torque. This rotation is coupled to a counter which continually registers total mass or weight of fluid passing through meter. It meters a wide variety of gases within a wide range of densities and flow-ranges.

For more data on above item, circle E55 on postcard, Page 243

"Dew Drop" High Dewpoint Depression Dehydrator gives guaranteed dewpoint depressions up to 140° F. Tri-ethylene glycol is utilized to produce extremely dry gas. Dew Drop permits dehydration at much higher wellhead temperatures.

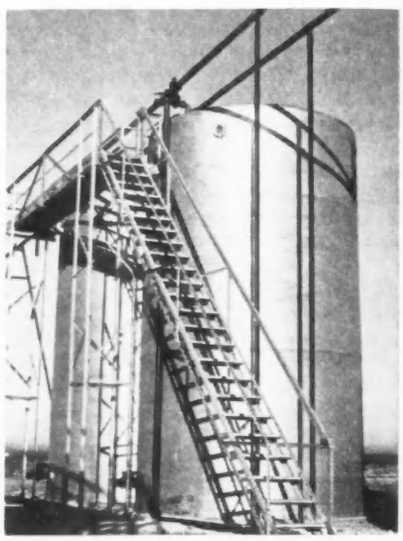
For more data on above item, circle E56 on postcard, Page 243

"Eskimo" Packaged Cold Weather Dehydrator is designed for economical and effective dehydration of small volume gas well production in isolated locations during extremely cold weather. Entire unit including housing is skid mounted. Galvanized steel housing encloses entire unit except absorber-separator heads and the burner end of regenerator. Models are available with 2 or 3 phases separation and nominal gas capacities of from 2 to



4 MMSCFD. "Eskimo" will produce gas with a minimum water dewpoint at 65° F below the inlet gas temperature or an outlet water dewpoint of 0° F., whichever is reached first.

For more data on above item, circle E57 on postcard, Page 243



Poxyglas is a new type tank that resists corrosion by all fluids normally encountered in oilfield production. It is corrosion resistant, combining continuous glass fiber rovings and thermo setting epoxy resins in a precision winding pattern over a mandrel. It is used for any function involving storage of corrosive substances. Poxyglas has high strength to weight ratio. Unlike molded glass fiber products, machine wound Poxyglas tanks have a "creep" characteristic of zero. The pattern of filament winding as it is fed to the mandrel is accurately controlled to produce uniform wall thickness. The tank diameter, for tanks wound on the same mandrel, is consistant. Coated or lined steel tanks last two or three years before coating must be repaired. Under normal conditions Poxyglas tanks should last indefinitely.

For more data on above item, circle E58 on postcard, Page 243

Bowen Itco, Inc.

Bowen Casing Roller eliminates possible damage to drilling and production equipment which can occur when this type equipment is forced through, or into, a section of collapsed or dented well casing. Used specifically to recondition and restore buckled, collapsed, or dented casing to its normal internal diameter and roundness, the Casing Roller is rotated and forced downward into the damaged area. As the tool is rotated into the reduced diameter, it exerts lateral forces on the casing to restore it to its original ID. Unique construction provides for reduced wear of the parts contacting the casing. The mandrel and all rollers are manufactured from special alloy steels, case-hardened to provide even better wear quality. The Casing Roller contains no small or intricate parts to be worn, broken or lost in the well.

For more data on above item, circle E59 on postcard, Page 243

Bowen Model 4050 Powered Swivel is used for all types of light or medium-duty rotary operations. It eliminates the necessity of moving in kellys, rotary tables or other heavy equipment for short time rotary work. Swivel provides driving power for internal cutting of casing, drill pipe and tubing; drilling out cement following squeeze jobs; backing off sucker rods and tubing; drilling out obstructions in casing and tubing; milling in casing and tubing; scraping liners and other similar operations. It consists of a prime mover unit, control unit, and swivel unit connected by hydraulic hoses. The unit is complete within itself, manufactured of the finest material available. All safety features possible have been designed and "built in." The swivel comes in several models to meet all weight and power needs, and has just undergone complete engineering advancements to make it the finest available.

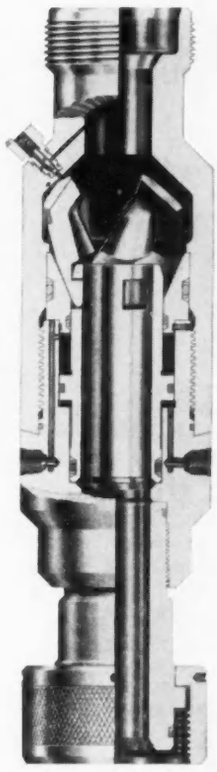
For more data on above item, circle E60 on postcard, Page 243

Bowen Conductor Line Jar may be used with any electrically-operated tool normally employed by conductor line service companies. It is advisable to run this tool when there is danger of becoming stuck, or when the drilled or casing ID closely approaches the OD of the tool being run; for example, bridge plugs, wire line packers, junk baskets and gage rings. The jar assures ability to strike a blow of controlled intensity while maintaining electrical continuity with the tool or tools below the jar. The coiled electric retractor cord is protected from well fluids. Intensity of the blow is controlled by the operator and no pre-setting or adjustment is necessary before going in the hole. Frequency of blows is limited only by the time required to slack off on the cable and pull a strain on the jar.

For more data on above item, circle E61 on postcard, Page 243

Bowen High-Pressure Wire Line Blowout Preventer is a hydraulically operated, segment-type, capable of safe, sure control of the well when using solid-type measuring lines under exceptionally high-pressure well conditions. Tested to 20,000 psi, with a recommended working pressure of 10,000 psi, the blowout preventer not only seals effiiciently, but has the additional safety advantage of remote operation. Segment rams are specifically designed for the complete shut-in of the well on .066-inch to .092-inch measuring line. All internal seals exposed to well pressure are patented Bowen Seals (Non-Extrusion Rings, Seal Protector Rings and "O" Rings). The preventer is particularly adaptable to permanent well completion services. Small OD tools such as extensible tubing, testing tools, shifting tools and mechanical perforators, all of which are run on solid-type measuring lines, will pass easily through the ID of the blowout preventer.

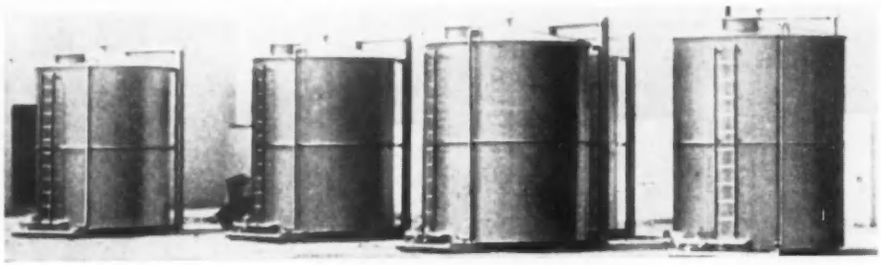
For more data on above item, circle E62 on postcard, Page 243



Bowen Releasing Rope Socket is designed to permit use of the full strength of the wire line during swabbing operations, yet gives immediate and positive release when the swab becomes stuck due to debris in the well. It is, in effect, a swabbing line safety joint, which assures positive release and removal of the wire line from the hole, leaving a clean, sure fish to engage and remove. The Rope Socket and its related tools, the Releasing Tool and Rope Socket Retriever, employ the latest engineering principles. Additional safety and recovery features have been incorporated into the overall design. After engagement of the Rope Socket Body with the Rope Socket Retriever, the operator can jar up on the fish. If the fish does not come free, a release pin can be sheared by bumping down and the Retriever released from the Rope Socket for removal from the well. If the fish cannot be removed, the special aluminum-alloy body of the Rope Socket may be dissolved by acid or caustic.

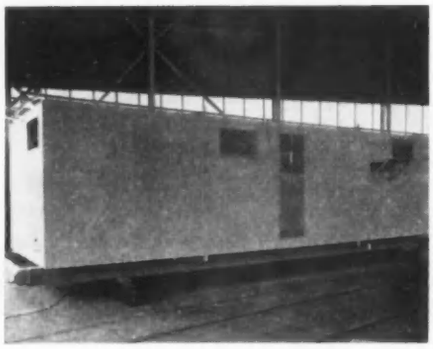
For more data on above item, circle E63 on postcard, Page 243

Fredk. Braby & Co., Ltd.



API Tanks are built to either API specification 12b (bolted) or API specification 12c (welded.) These tanks can be supplied in self color, painted or galvanized. Various connections and fittings can be supplied to suit the customers' requirements. Deliveries are excellent and some of the tanks built to specification 12b are available from stock. The Company can manufacture any type of tank or vessel required by the oil industry.

For more data on above item, circle E64 on postcard, Page 243



Expatriate Personnel Cabin is of all steel construction specially built for desert conditions and is fully insulated and air-conditioned. It is designed to accommodate two men, providing three compartments: one is equipped as a bedroom with two beds, lockers, etc.; the second serves as a toilet and is equipped with one shower, w.c., and two washbasins; the third compartment is a kitchen/dining room with built-in cooker, refrigerator, sink unit, cupoards, table, and chairs. All electrical and water connections are built in and simple connecting points are provided on the outside of the unit. The body work is galvanized steel, mounted on a heavy duty skid base. Lifting points are provided at the top of the unit for ease of handling. Units of similar design are available for various duties and include Expatriate or Local Labor living accommodations, sleepers, kitchens, toilets and diners, covering all requirements of a full oilfield camp.

For more data on above item, circle E65 on postcard, Page 243

Bucyrus-Erie Company

Model 120-SL Mobile Servicing Rig is designed for well service and rotary workovers to 12,000-foot depths. Emphasizing such field needs as bigger, sturdier brakes; increased engine power and load capacity; and combined over-the-road and drive-in mobility, the 120-SL incorporates the following features: Rugged compact drive-in type construction with power steering, air brakes, complete road visibility, and comfortable one-man cab; advanced heavy duty drawworks construction with identical, interchangeable main and sand line drums, outboard mounted air clutches, and oversized, hydraulically equalized brakes; unique grouping of controls at operator's station; 9-speed forward—2 reverse, fully-synchronized transmission with air assist shift and remote control; hydraulically raised and extended structural steel 67-foot mast with 180,000 pound hook load capacity; and sturdy structural steel frame. For over-the-road travel, the telescoping derrick folds down over rectangular carrier, and machine's 25-ton weight is distributed over three heavy duty axles.

For more data on above item, circle E66 on postcard, Page 243

Model 10-R Truck-Mounted Combination Mud-Air Rotary Drill is designed to handle seismograph, exploration and shallow oil production where applicable. Small, compact, ruggedly built, the 10-R embodies such heavy duty features as: A Beco-built split-type power take off with individual friction clutch drives for all main machinery; a double-drum drawworks with sturdy, long-life brakes and clutches; a Beco-built spiral bevel gear rotary table with 4-speed forward and reverse drive; and a sturdy pipe storage rack. A continuous-type chain feed pull-down, powered through a dual range hydraulic system, affords infinitely variable control over pressure on the bit. The steel mast, constructed of square tubing, is hydraulically raised and lowered, can be used with 15-foot long drill pipe. Five-foot mast extension is available (optional) to handle 20-foot pipe. Self-adjusting, built-in breakout wrench; conveniently grouped controls; and choice of air compressor or mud pump, both V-belt driven from PTO unit, are additional features.

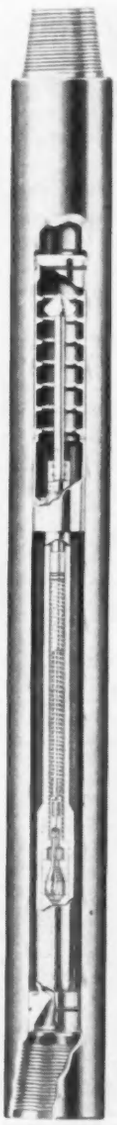
For more data on above item, circle E67 on postcard, Page 243

Byron Jackson Tools, Inc.

Friction-Grip Stop Collar is the newest addition to Byron Jackson centralizer-scratcher line. New weldless stop collar has advantages of low cost, fast installation and maximum strength with minimum marking and scarring of pipe. Inner surface of split-ring type collar is treated with special friction-inducing material that provides rated holding force of 10,000 pounds in all sizes. There are no set screws to tighten. Held in place on the casing with two allen-head cap screws, new stop collars can be easily and rapidly installed in the field by one man. Friction-Grip Stop Collars are

available for the following casing sizes: 4½, 5½, 7, 7⅝, 8⅝, 9⅝, and 10¾-inch. Weight ranges from 1½ pounds (4½-inch size) to 3½ pounds (10¾-inch size).

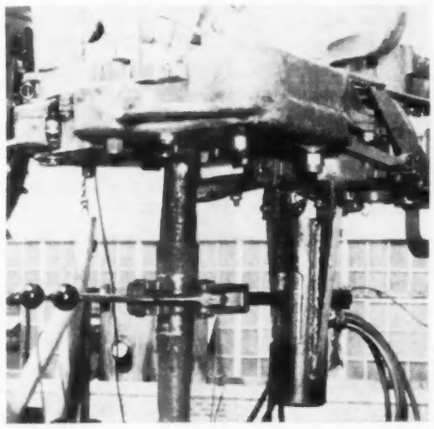
For more data on above item, circle E68 on postcard, Page 243



BJ Teledrift provides a continuing check on hole deviation during drilling. It consists of a rugged, all-mechanical sensing-signalling tool that is made up in a special sub just above the bit. Pressure surges in the mud flow through the tool generate deviation signals that are received by a surface recorder, which provides a permanent, individual chart of each reading. Teledrift generates a maximum of 7 signals, each representing an increment of hole angle, and can be adjusted to measure any 7 angles of deviation up to 10½ degrees. The tool provides an automatic reading whenever mud pumps are shut down, as when adding a single. Additional readings may be taken at any time, with shutdown of only 45-60 seconds. Teledrift decreases down time, reduces danger of sticking drill pipe and allows heavier weight on the bit, with increased penetration rates.

For more data on above item, circle E69 on postcard, Page 243

Power Tubing Tong Back-up eliminates separate back-up tong and hanging line formerly required with power tongs. Attached to power tool by simple welding operation (no cutting necessary), the tong back-up holds tubing string rigidly in slips while a stand is being made up or broken out. Principal advantages are that it speeds running tubing, increases crew safety and reduces labor costs. Weighing only 30 pounds, the back-up is readily latched on or off the pipe, has a toggle action for no-slip gripping. It is spring-balanced for easy vertical positioning. A sliding lever makes for quick horizontal spotting and provides complete access to joint when retracted. Free-floating tong will grip tubing, upset



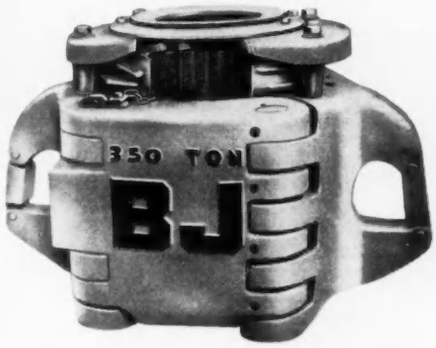
or coupling; is available in 2⅜, 3½, and 3½-inch-4½-inch jaw sizes. It can be used with all Byron Jackson power tubing tongs.

For more data on above item, circle E70 on postcard, Page 243

Nuclear Magnetism Log (N ML) gives a direct, quantitative measurement of free fluid within a formation that is potentially available for production. It also delineates fluid-bearing zones and identifies nature of fluid, whether water or hydrocarbon. NML equipment consists of an instrumentation-wireline truck capable of logging to 15,000 feet and a 20-foot downhole sonde (tool) containing control electronics and a polarizing coil. The tool, which has a 4-inch OD, can withstand pressures to 10,000 psi at 300° F. Free Fluid Log is obtained by lowering the sonde downhole and making a series of measurements that are automatically recorded, along with depth. Logging runs are made either in motion or station-to-station, with a current logging rate up to 20 ft./min. NML technique provides both an immediate oscilloscope reading and a permanent well log.

For more data on above item, circle E71 on postcard, Page 243

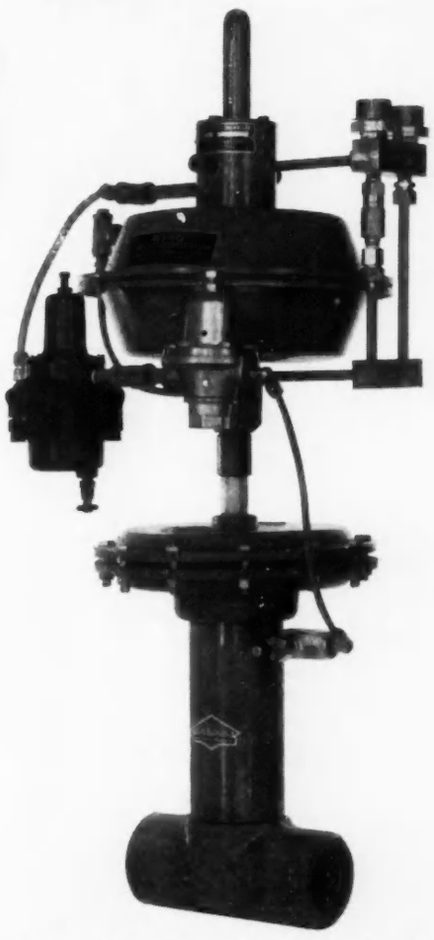
BJ 350-Ton Elevator-Spider is a powerful combination tool, developed for today's deep holes and long casing strings. Its streamlined, functional design allows maximum crew safety and efficiency, while permitting the tool to do double duty as a casing spider or as an elevator. The quick, rugged locking mechanism provides a positive, foolproof



hold on the casing when slips are set, and holds slips safely in the "up" position, they are raised with the yoke handle. A double-hinged, swingaway door allows tool to be quickly latched on or off the pipe—without stripping. Unitized slip assembly has 14 inches of insert contact length, ensuring a safe, sure grip on casing while reducing possibility of pipe deformation to a minimum. Elevator-Spider will handle all API casing sizes from 4½ through 13⅜ inches by means of quickly interchangeable slip assemblies and inserts.

For more data on above item, circle E72 on postcard, Page 243

CAMCO, Inc.

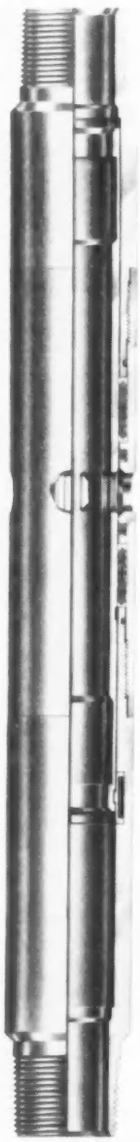


Camco-King Time Cycle Controller is designed to provide fully automatic time

cycle and pressure control of intermittent gas injection operations. It is particularly recommended for offshore or other unattended installations. Pneumatically operated, the Controller is recommended for any application that requires automatic opening and closing of motor valves on a predetermined time schedule. Designed for a wide range of fine adjustments, it is operated with ordinary gas pressure and can be mounted on any type Camco motor valve. The pneumatic operation virtually eliminates any possibility of mechanical failure. A bellows-activated shut-off valve is available as optional equipment for tubing or casing pressure control. The controller can be changed from direct to indirect acting by simply reversing the check valve in the line and mounting controller on correct type motor valve.

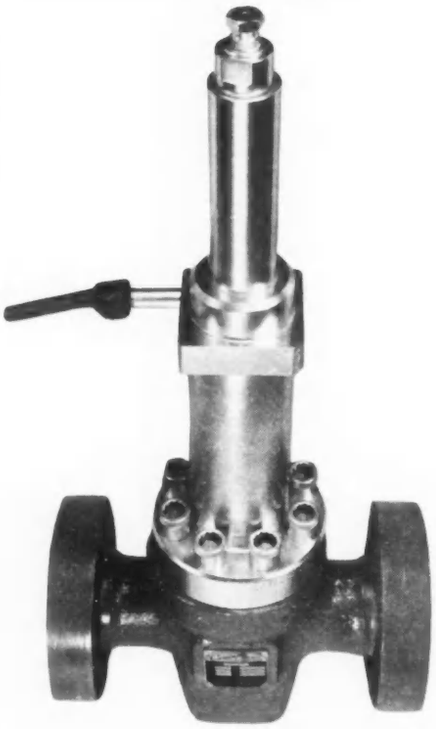
For more data on above item, circle E73 on postcard, Page 243

Type "C" Sliding Sleeve Circulating Valve provides a circulating means for use in permanent type well completions, for killing a well, or for spotting acid, fracturing, etc. It is also used for directing flow from the casing to the tubing in either selective or alternate completions. Any number of sleeves may be run in a tubing string and operated selectively with shifting tools in common use in the industry. Having collar OD and essentially full-opening tubing ID, the sleeve has a tensile strength in excess of that of P-105 tubing in all sizes. Low friction, high pressure dual seals on either side of circulating ports permit shifting that is virtually unaffected by high temperatures and high pressures. Pressure relief slots provide a means for relieving pressure differentials before completely shifting the sleeve. A stainless steel inner sleeve, stainless steel detents for corrosion resistance, plus a minimum area of possible sand fill-up in the closed position, provide added assurance of shiftability after being closed for long periods of time.



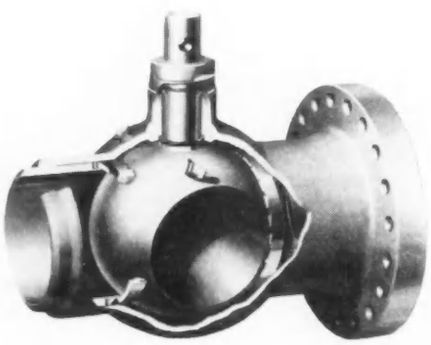
For more data on above item, circle E74 on postcard, Page 243

Cameron Iron Works, Inc.



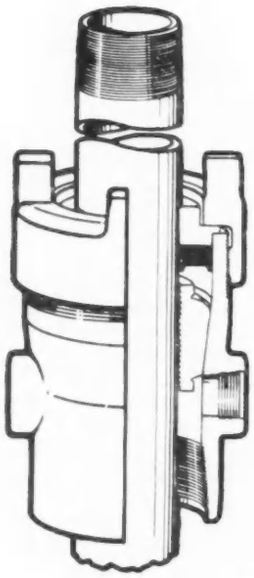
Automatic Safety Valve, for christmas trees or well head manifolds, is designed to protect unattended lease equipment 24 hours a day. Whenever pressure rises or drops beyond preselected points the valve closes with a firm, regulated action. Control pressure may be in valve body itself or from a remote source, and a manual control provides instant overriding action for conventional operation or resetting. Design is simple with only three main moving parts. High and low trip points are independently adjustable and accuracy is not impaired by extended periods of operation. Available in all API pressure ratings.

For more data on above item, circle E75 on postcard, Page 243



Ball Valve is non-lubricated and has a spherical closure member which rotates one-quarter turn to open or close. Incorporating exclusive rotating seat principle, seal is effected by pair of teflon faced seats which rotate a fraction of a turn each time valve is opened. In all valves, maximum wear occurs on seating surface area which is struck by erosive blast of line fluid just as port is uncovered on opening, or just as flow is being pinched off on closing. Rotation of seats distributes wear equally over entire sealing surface and extends life of valve many times. No lubrication is required to maintain a seal or for easy operation, thus eliminating maintenance expense. Manufactured in reduced and full-bore sizes, 2-inch to 36-inch and in the full range of API and ASA pressure ratings.

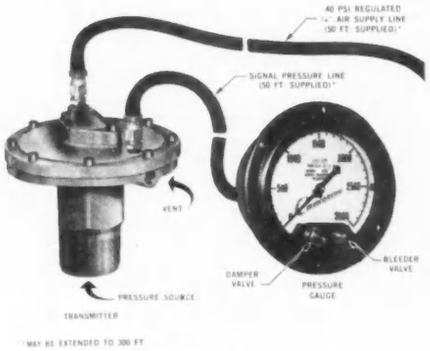
For more data on above item, circle E76 on postcard, Page 243



Independent Low Pressure Casing and Tubing Heads, Type "L," are designed for versatility in casing and tubing suspension and may be adapted for tubingless or multiple completions. All Type "L" heads are forged steel and rated at 2,000 pounds W.P. Outlets range from 2⅜-inch OD to 3½-inch OD line pipe threads. Tops of heads are threaded with male casing threads so that caps may be replaced with companion flanges for blowout preventer installation. Both slip and mandrel types of suspension are available, either with or without stripper rubbers. Heads are manufactured with bottom threads for 4½-inch to 10¾-inch casing and for suspending 1½-inch tubing to 7⅝-inch casing.

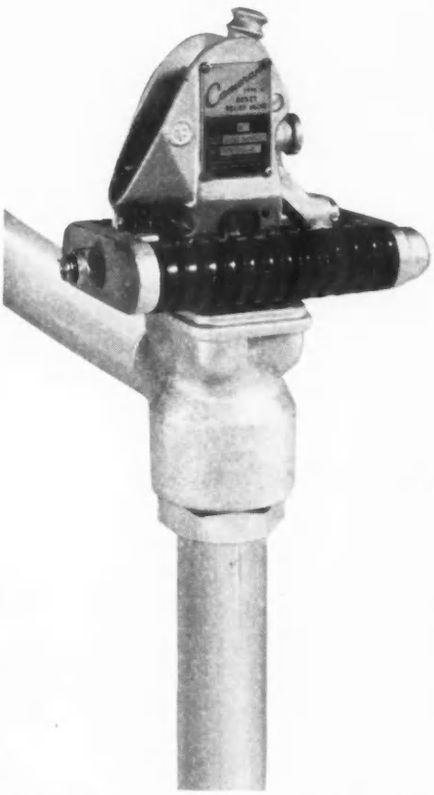
For more data on above item, circle E77 on postcard, Page 243

Remote Reading Pressure Gage, Type "J," consists of transmitter located where pressure is to be measured and a receiver gage located where pressure is to be read. The transmitter, which is threaded with 2-inch male and 1-inch female pipe connections, is permanently sealed and adjusted and 100 percent pressure overload will not damage mechanism. Rugged re-



ceiver gage is equipped with built-in damping valve and push-button valve to bleed moisture out of line. Combination air filter and regulator furnished with the unit regulates rig air to 40 psi to supply the transmitter. Transmitter signal pressure may be used to operate more than one receiver gage or other instrumentation. Available in three ranges: 0-3,000 psi, 0-6,000 psi, and 0-10,000 psi. Gages calibrated in Kgm./sq. cm. and other special markings are available on order.

For more data on above item, circle E78 on postcard, Page 243



Reset Relief Valve, Type "A," instantly relieves destructive pressure overloads on slush pumps and manifolds. Valve is continuously adjustable in service and opens full without throttling. The piston moves clear and stays clear until valve is reset manually. No unguarded moving parts, or shear pins, insures complete safety in operation. Surging pressure, vibration or extended operation does not affect accuracy of original setting. Moving a single lever resets valve with little effort since resetting does not require compression of springs. A release button provides quick, easy discharge at any time, regardless of line pressure. Available in two W.P. ranges: 750-2,500 psi and 1,500-5,000 psi.

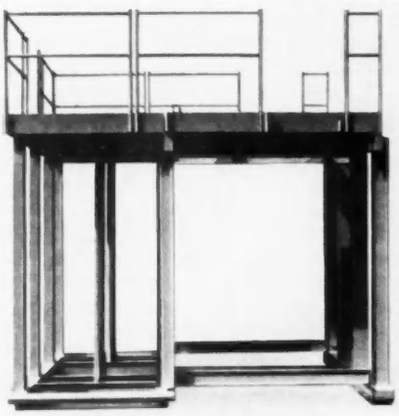
For more data on above item, circle E79 on postcard, Page 243

Capital Manufacturing Co. Division Harsco Corp.

Forged Steel Needle Valve has all forged steel body, 303 stainless steel stem, and Teflon packing. The threads of each valve are carefully cleaned to remove all chips and shavings. The valve body is phosphate coated for maximum protection and appearance. Valves are designed for maximum working pressure of 10,000 pounds and are available individually pressure tested. Available for prompt shipment in sizes ⅛-inch through ½-inch.

For more data on above item, circle E80 on postcard, Page 243

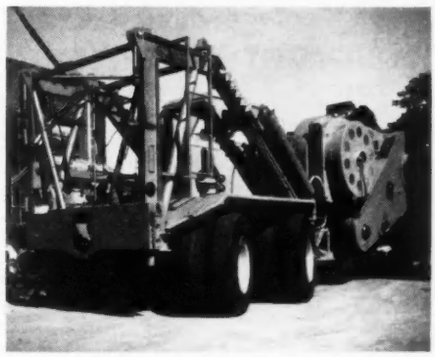
Cardwell Manufacturing Co.



Wide-Open Substructure for big well heads, multiple flow lines, big fracturing or treating heads, is designed for maximum speed in rig-up and rig-down operations. Substructure can be set in place around the well head and the trucks released. After nippling down, drop-in rotary table and floor sections can be put in place with the traveling block. After substructure is completely assembled, a large wide-open area of 7 feet 4 inches by 16 feet remains clear around the well. Substructure is available in various heights.

For more data on above item, circle E81 on postcard, Page 243

Model KM 250 and KM 210 Drive-In Units for workover, drilling, well completions, and servicing now have two front axle duals, featuring independent front wheel rotation, available as optional equipment. Unique, independent wheel rotation allows each wheel to turn at a different speed, thus eliminating drag and tire wear while maintaining maneuverability of single wheel axles. Although



axle load remains unchanged, load is distributed to more tire and ground surface and cuts unit pressure per square inch in half. This new feature allows heavier legal rig load, minimizes surface damage on lease roads and lightly-constructed access highways, and prevents "sinking-in" on soft terrain and in the area close to the well. A system is provided for equal braking on all wheels.

For more data on above item, circle E82 on postcard, Page 243

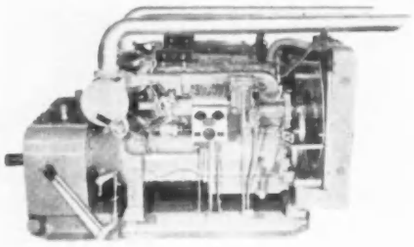
Clark Oil Tools

Clark Cement Spinner is designed to eliminate cement channeling, to reduce cement contamination and to reduce chance of lost circulation, turbulent flow of cement around the casing. It is particularly effective in spacing on multiple and tubeless strings. The Spinner is locked in place by three allenhead, burred set screws and no welding is required. Spinner is made of a high strength aluminum alloy with high impact and shock resistance, superior corrosion resistant qualities. Available in all standard casing sizes from 2⅞ through 13⅜.

For more data on above item, circle E83 on postcard, Page 243

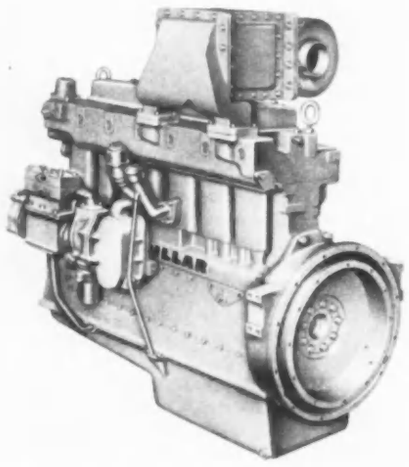
Caterpillar Tractor Company Engine Division

Caterpillar Compound Package combines the power of two Caterpillar D333 oil field drilling engines. The Brewster Company Inc. of Shreveport, Louisiana designed and developed a mechanical compound specifically for these Caterpillar turbocharged and after-cooled engines, making it easy to combine the



power output in a compact space. This unit has a 2.2:1 reduction ratio, providing 1,000 output shaft speed with an engine speed of 2,200 rpm. Intermittent bhp is 350 at 1,000 rpm, and continuous bhp is 280 at 1,000 rpm. Four basic power unit arrangements are available: (1). Compound with mechanical or air clutches and center located stub shaft output. (2). Compound with Twin Disc 6-1500 Single Stage Torque Converters. (3). Compound with mechanical or air clutches and center located Twin Disc F-11500 Converter with chain housing output. (4). Compound with mechanical clutches and direct connected single bearing, 1,800 rpm, 200 KW generator.

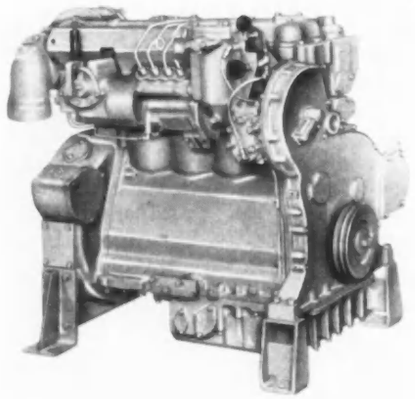
For more data on above item, circle E84 on postcard, Page 243



1673 Diesel Truck Engine offers 220 horsepower at 2,200 rpm. It is a six cylinder turbocharged and aftercooled power plant of 4.5-inch bore and 5.5-inch stroke. Oil field diesel trucks with gross weights of 26,000 pounds or more, or gross combined weights of 50,000 to 75,000 pounds, are in the horsepower class to use the 1673. Features include: A trouble-free fuel system, compact four-cycle design and mechanical excellence. In the 1,900 to 2,100 rpm range, the 1673 uses only .398 pounds of fuel per brake horsepower.

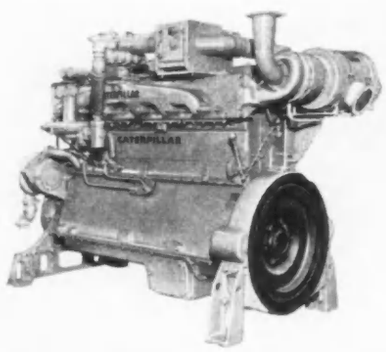
For more data on above item, circle E85 on postcard, Page 243

D320, D330 and D333 Diesel Engines have been introduced to meet the heavy demand for compact diesel power packages. All are four cycle, valve-in-head, precombustion chamber models, available as turbocharged or turbocharged and aftercooled. Overall compactness pro-



vides ratios of 11.1 lb./hp for the D320, 9.6 lb./hp for the D330, and 8.4 lb./hp for the D333. The Caterpillar fuel system allows these engines to operate with high efficiency on fuels ranging from JP4 jet fuel to crude oil without changing the fuel pumps or injectors. They operate continuously during their lives with almost no power droop or fuel consumption increase. These units are offered in industrial, electric set, and marine configurations. Maximum horsepower on the turbocharged and aftercooled models is 255 at 2,200 rpm for the D333, 170 at 2,200 rpm for the D330, and 120 at 2,400 rpm for the D320. The D333 has six cylinders, and the other two engines have four cylinders each.

For more data on above item, circle E86 on postcard Page 243



G342, G397 and G375 Natural Gas Engines have been boosted in power by the addition of turbocharging and aftercooling. Engines in the G342 and G375 sizes are 280 and 380 horsepower respectively for continuous operation. Horsepower is raised as much as 90 percent on the G397 to a continuous rating of 560 horsepower. These engines also will continue to be offered as naturally aspirated models. Records showing fuel consumption of the G342 at the rate of approximately 7,000 btu (low heat value) per brake horsepower hour continuously give ample proof of this engine's low cost performance.

For more data on above item, circle E87 on postcard, Page 243

The Ceilcote Company

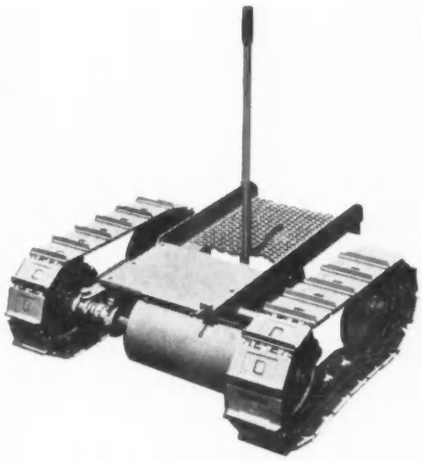
Ceilcoat No. 648 Grout is designed for grouting pumps, compressors, and similar equipment where vibration, load, temperature, and corrosion conditions are unusually severe—providing important savings in terms of greater grout life and shorter downtime. Features include a tensile strength of 1,950 psi, compression strength of approximately 1,000 psi, greater impact strength and abrasion resistance, virtually no shrinkage, imperviousness to oils and low moisture absorption, fast hardening. No. 648 grout may be poured in depths up to six inches at one time. Small equipment can be returned to operation 24 hours after the final pour. A 48-hour cure at normal temperatures is recommended for larger pieces of equipment that put greater stresses on the grout. It is ideal for equipment that must be maintained level, and is especially suitable where chemical resistance is required. Applications include all types of gas engines, motors, generators, and pumps, as well as building columns and anchor bolts.

For more data on above item, circle E88 on postcard, Page 243

Charles Machine Works, Inc.

Ditch Witch Crawler Trencher

Ditch Witch Crawler Trencher is available in all M series machines in either 9 or 12 horsepower models. They are especially suited to applications where traction or flotation is marginal, or where a considerable amount of maneuverability is required. The crawler trencher is completely self-propelled and equipped with a steering device which takes all of the "muscle" out of maneuverability. It has proven well adapted



D.W. Crawler Trencher Kit

to digging in frost or rocker soil conditions because of additional weight. It maintains a "straight as an arrow" trench with ease. A crawler adapter kit also is available which can be easily mounted to any M-3 series machines produced in 1959 or 1960. It can be attached to the frame of the machines with five bolts after the removal of the axle and axle bearings.

For more data on above item, circle E89 on postcard, Page 243

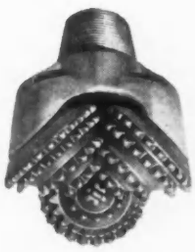
Chicago Pneumatic Tool Co.

Slant-Jet Three-Cone Rotary Rock Bit represents more than two years of intensive research into hole cleaning techniques. Slant-Jet features three replaceable nozzles, all inclined at a considerable forward angle. Each nozzle directs a high velocity fluid stream toward the hole bottom, striking immediately behind the trailing edge of the forward cone. Cuttings are pried loose, swept in the direction of rotation, and thrust upward toward the surface. No fragments are scattered on hole bottom, or forced back under the teeth of the approaching cone. New, clear formations are always exposed for Slant-Jet's tungsten carbide teeth to bite. The result is longer life, more footage, greater penetration. All Slant-Jet bits use high grade alloys. Each tooth, individually formed and arranged for a specific formation, is heat treated. All gage surfaces are hard-faced for true gage maintenance. Balanced construction assures unobstructed passages for full flow returns from hole bottom.

For more data on above item, circle E90 on postcard, Page 243

C-1 Three-Cutter Piloted Reamer is a one-piece reaming bit designed for enlarging holes. Three giant replaceable cutters, securely welded into machined pockets, provide a penetrating, gouging-cutting action. Ample clearance around the cutter assemblies permits easy removal of cuttings, eliminating packing and increasing drilling speeds. Rugged load-carrying ball and roller bearings, specially hardened to withstand the punishing pressures required for big-hole drilling, provide long-run, smooth, frictionless action for each of the cutters. Welded securely to the lower end of the bit head, a diamond point pilot provides guidance for the reamer. Easily replaceable, the diamond point pilot can be field-removed when worn. Completely self-contained, the C-1 Piloted Reamer requires no special drill pipe, collars, reamer bodies, or junk baskets.

For more data on above item, circle E91 on postcard, Page 243



EH-4 Three-Cone Rotary Rock Bit is designed for the hard, extremely abrasive formations of high compressive strength. The EH-4 features a rugged one-piece cone arrangement of individually formed, round-crested teeth. Thus, there are no inserts to chip out in-hole. Tungsten carbide backing at the gage surface resists wear, maintains true gage. Balanced construction assures unrestricted passages for full flow, better hole cleaning of hole bottom. The EH-4 is available in both standard and jet bit types.

For more data on above item, circle E92 on postcard, Page 243

Churchill Inc.

2D-5T-12S

5DL-10T-30S

Independent Pitman and Crossarm Assemblies with "Friction Ease" Non-Metallic Bearings incorporates the following features: (1) The crossarm is mounted on a radius centering shoe allowing adjustments for perfect alignments. (2) The bearings, located on each end of the crossarm and mounted in a vertical line with crank pin bearings, greatly reduces pressure buildup. (3) Independent dual pitman arms allow better balance of load to each crank and may be replaced singly, interchanged, or turned from end to end. (4) "Friction-Ease" non-metallic bearings and thrust washers used throughout pitman and crossarm assembly, eliminates metal to metal friction drag. Shock loads, normally transmitted to gear case, are greatly dissipated. The geometry of design and "Friction Ease" bearing properties practically eliminate bearing failures.

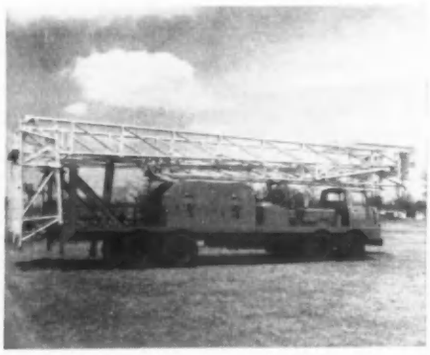
For more data on above item, circle E93 on postcard, Page 243

Fred E. Cooper, Inc.

Cooper Model A32-32 Well Service Machine is available with a choice of gasoline, LPG or diesel engines. The engine power is delivered through friction clutch and synchro mesh transmission or torque converter and synchro mesh transmission which are designed to work together. All chains are enclosed in chain cases and are provided with lubricators. The drums are driven through non-slip air friction clutches which are self adjusting. Positive type clutches are also available. The drums

are equipped with the latest design Cooper brakes which are 32-inch diameter with 8-inch wide faces. They are made of tough long lasting alloy steel. The machine may be equipped with a fabricated mast, or pipe mast best suited to the job. These new machines have ample capacity for medium depth well servicing but are of moderate weight. They are well balanced and may be easily transported by a medium size truck.

For more data on above item, circle E94 on postcard, Page 243



86 foot Cooper W-86 Derrick was developed to fill oilfield requests for a derrick with easy portability and quickly rigged up. It is designed to be used in the many areas where 86 ft. clear height from the ground to the crown is sufficient. The W-86 is of high strength, light weight tubular design. Even though light in weight for a doubles derrick, it will handle heavy loads with safety. It is rated at 160,000 pounds hook load with six lines. A liberal safety factor has been used in determining its safe loads. The derrick is erected hydraulically. The upper section folds with rams. However, if preferred the upper section may be telescoped hydraulically. The hydraulic system is designed with capacity to operate tongs and other power tools at the well. The crown sheaves are mounted on roller bearings sized to give years of service. The standard racking board will hold 12,000 ft. or 2⅞-inch pipe. A greater racking capacity can be supplied if desired.

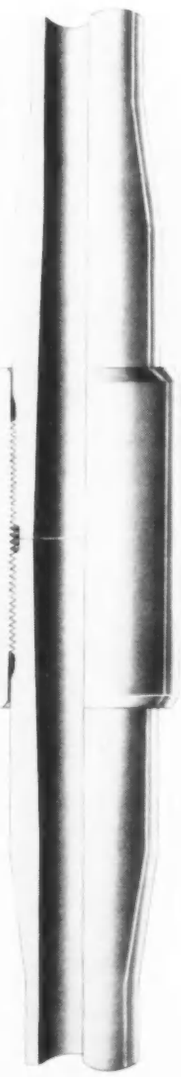
For more data on above item, circle E95 on postcard, Page 243

Continental Emsco Company

D + B One-Inch Bore Slim Hole Insert Pump is for use in slim hole pumping wells employing a 1¼-inch nominal ID tubing string. This pump features a precision honed barrel tube, chrome plated pin end plunger, armored cages, superloy balls and seats, and a three cup bottom hold-down. The armored cages are made of a high quality alloy steel which results in longer valve life. The design of this pump permits unrestricted filling of the fluid chamber, assuring greater pump efficiency and fluid compression to assist in eliminating gas lock. Pump lengths range to 24 feet with a maximum stroke of 205 inches. There is a sucker rod pin connection on top of the pump for ½-inch sucker rods. Also available for use with this pump are D + B seating nipples with a 1 15/64-inch bore and 1¼-inch 10 Rd. EUE tubing pin threads.

For more data on above item, circle E96 on postcard, Page 243

Continental Sucker Tubes are primarily designed for use in slim hole completions employing 2⅞-inch OD EUE tubing for casing. They are used in lieu of the sucker rod string, and in most instances serve as a fluid conduit to the surface. Sucker Tubes are made of 1-inch J-55 API tubing and are designed with a 1⅛-inch API sucker rod pin and pin thread. They use a special 2-inch OD x 4-inch coupling which permits a fully abutted internal joint. This results in reduced pin stresses and also prevents corrosive well fluids from contacting threads. Minimum internal upsetting provides maximum flow passage through the joint without adversely affecting its strength. This lowers fluid friction to keep more gas in solution, thereby reducing corrosion attack and fluid erosion at the end of each joint. Pressure drop is also minimized, resulting in reduced paraffin deposition.



For more data on above item, circle E97 on postcard, Page 243

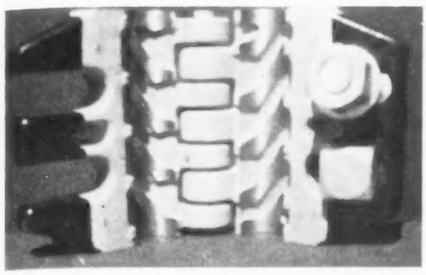
Type 600 Green Triangle Threadless Pipe Fittings, withstanding pressures up to 1,000 psi, are manufactured by Telsco Industries and distributed by Continental-Emsco. Made from shock-resistant, high-tensile malleable iron castings, the fittings are designed to be used with regular steel, aluminum, or thin-wall steel pipe. Special fittings are furnished for use with plastic pipe. Fittings require no special preparation of pipe ends such as threading or grooving, and are easy and fast to install with only an ordinary pipe wrench. The new series can be applied to tank battery hook-ups, flow lines, salt water disposal systems, pipe repairs, rig fuel and water lines, or temporary and miscellaneous piping. Sizes available in the Type 600 are 2-inch and 3-inch. A complete variety of fittings is offered.

For more data on above item, circle E98 on postcard, Page 243

Win-Well Green Triangle Rotary Selector Valve replaces normal headers in applications such as manifolding, metering, testing, gathering, tank-switching, waterflooding, and product gathering. The valve can isolate one incoming flow line for testing while fluid from the other lines continues through the normal production system. When selecting a flow line to be tested, the rotor is turned manually or automatically by a sequence control. All wearing parts are of Teflon. The only moving part is the valve's inner plug or rotor, which operates on Teflon bushings at the top and bottom and with a Teflon seal at the port. The valve body is made of Meehanite, a high grade iron alloy, to provide high corrosion resistance. All models are rated at 600 psi.

For more data on above item, circle E99 on postcard, Page 243

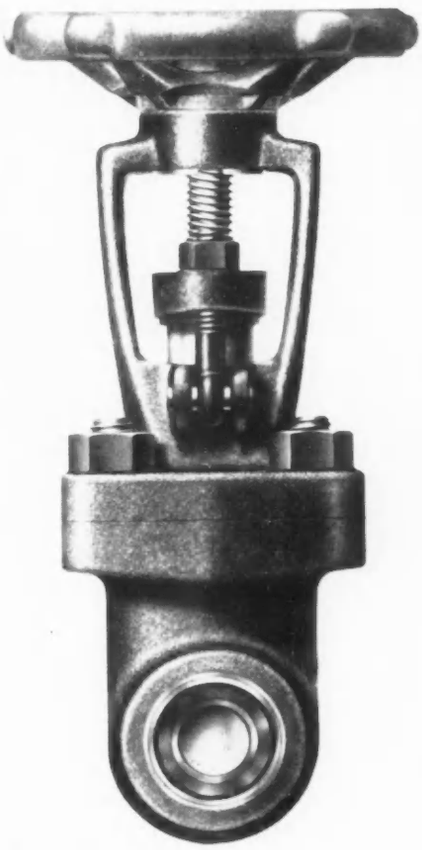
Crall Products, Inc.



Crall Spiral Grip Polished Rod Clamps give 360° grip on polished rod. The body is made of new patented ductile steel which will not mar the polished rod, is more resistant to climatic changes and has been found to be one of the finest materials for handling sudden changes in impact loads. Bolts, nuts and washers are case hardened and cadmium plated for high strength and resistance to corrosion. New offset Spiral has proven to have superior gripping qualities. It comes in both one-bolt and two-bolt sizes. One-bolt size, Series #180, handles polished rod loads to 25,000 pounds and two-bolt size, Series #280, to 40,000 pounds. Also made, are three other Crall Spiral Grip Polished Rod Clamps to round out line.

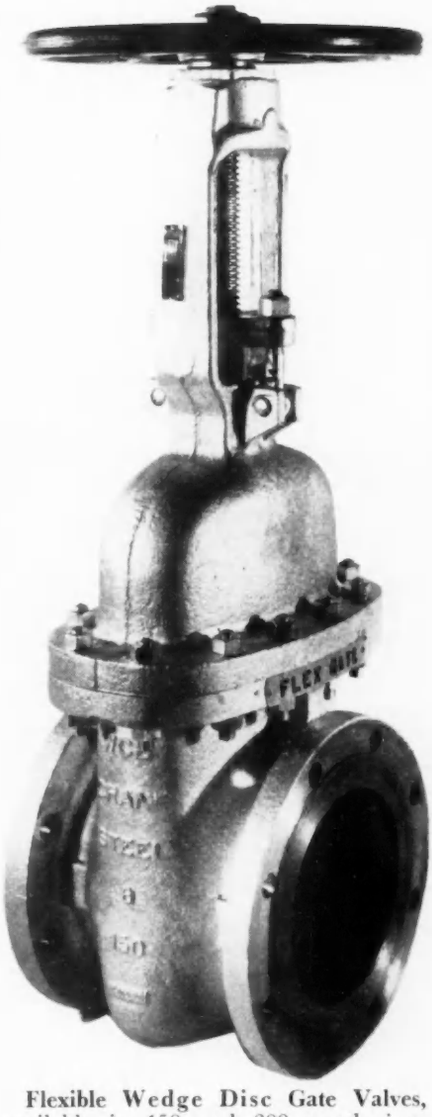
For more data on above item, circle E100 on postcard, Page 243

Crane Company



Forged Steel Gate Valves, in sizes ranging from ¼-inch to 2-inch, have been redesigned to extend service life and facilitate maintenance. Class XU Universal Trim, consisting of Exelloy disc and Stellite-faced seat rings, is suitable for use at temperatures of up to 1,000° F. on oil and oil vapor. Structural features include: (1). Malleable iron wheel with non-slip gripping knobs (except on 2-inch size) with set screws locking wheel to yoke sleeve, (2). Stem is heat treated Exelloy, finished with a tapered shoulder for back-seating in the bonnet, (3). Ductile Ni-Resist yoke sleeve combines excellent bearing qualities, a high melting point, and good resistance to atmospheric corrosion, (4). Two-piece ball-type packing gland will not bind even under uneven stress, (5). Stainless steel swing-type eyebolts are hinged to the bonnet (cannot fall off), and permit easy access for servicing.

For more data on above item, circle E101 on postcard, Page 243



Flexible Wedge Disc Gate Valves, available in 150 and 300-pound sizes, have a new flexible wedge disc. The working pressure of the 150-pound valve ranges from 40 psi at 1,000° F. to 275 psi at 100° F. The 300-pound valve has a range from 85 psi to 720 psi at similar temperature range. Valves operate easily, even if closed while hot and allowed to cool. As body seats pinch the disc, it flexes slightly to conform to the new seating position. New flexible wedge disc also compensates for minor misalignment of seats due to pipe line deflections. Flex Gates stay tight, but always seat and unseat with minimum torque, thereby assuring minimum wear of disc and seats. Body and bonnet are cast carbon steel with heavy metal sections. Designed for economical servicing, the body seat rings can be replaced and seating faces refinished.

For more data on above item, circle E102 on postcard, Page 243

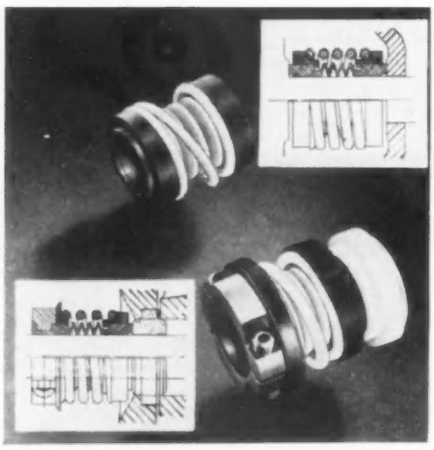
Converto-Gear Operator is designed to provide power-assist in opening and closing iron and steel O.S.&Y non-rising stem gate valves having stem diameters of 2½-inches or smaller. The operator uses a bevel gear with 4.11 to 1 ratio, and the unit is adaptable for either pneumatic or electric power wrench operation. Features include: (1). Stocked at the factory and available for immediate shipment. (2). On in-field service, the valve can be converted and the operator installed in less than 30 minutes while the valve is in service and using commonly available hand tools and wrenches. (3). Designed to provide for simple non-critical assembly. (4). Spiral cut bevel gears give improved performance and long wear life. (5). Gears are mounted with three sets of anti-friction ball bearings, giving optimum gear tooth engagement and over-all efficiency. (6). Gasketed joints and oil seals are oil-tight. (7). Adapters for non-rising stem geared valves incorporate a new stuffing box with special packing which provide for convenient and improved means of adjustment and addition of packing. (8). The operator is adaptable to either vertical or horizontal valve installations.

For more data on above item, circle E103 on postcard, Page 243

Crane Packing Company

Thred-Tape Pipe Joint Sealer now is offered in 4 widths—¼-inch for pipe widths up to ½-inch; ½-inch for ½ to 2-inch pipe; ¾-inch for 2 to 4-inch pipe; and 1-inch for 4-inch pipe and over. Made of Teflon, Thred-Tape has proved effective for handling the most destructive acids, caustics, corrosives, biologicals, toxics, and gases. It withstands thousands of pounds of pressure, temperatures from —250° to +500° F., and can be used on all types of piping. To seal the joint, Thred-Tape is wrapped around the male threads. The connection is made in usual fashion. Because of the lubricating characteristics of Teflon, joints can be drawn up to maximum tightness. Thread-Tape remains permanently plastic, permitting easy disassembly of connections after years of service.

For more data on above item, circle E104 on postcard, Page 243



Type 20 Corrosive Service Shaft Seal is designed to handle all concentrations of acids and salts, strong oxidizing or reducing agents, and all organic compounds. A bellows-type construction makes it specially suited for many slurry applications because it eliminates improper seal operation due to slurry build-up along the pump shaft. It also allows maximum seal axial flexibility to compensate for pump shaft runout. The seal is made of Teflon in all areas that contact liquid or gas. The virgin Teflon bellows is molded and sintered to a sealing washer of glass-filled Teflon. The spring is covered with a Teflon sleeve, which is covered at both ends, assuring complete corrosion resistance under practically all conditions. The seal is available in two single face types, one for internal and the other for external mounting, depending upon the application. A double face type also is available for internal mounting only. Shaft sizes range from ⅝-inch to 3-inch.

For more data on above item, circle E105 on postcard, Page 243

W. H. Curtin and Company

Curtin Oil Centrifuge Tube, 200-parts, Short Cone Shape, shape and size being identical to ASTM Short Cone Shape Tube but graduated in 200 parts, in effect doubling actual capacity to permit reading percentages of BS&W direct when testing samples containing equal volumes of oil and diluent. Tubes feature permanent, fused-in white line graduations. Each tube is retested to insure accuracy.

For more data on above item, circle E106 on postcard, Page 243

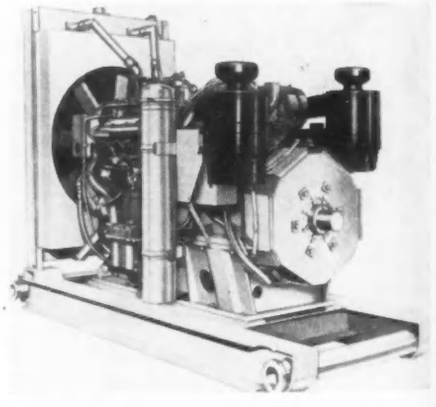
Curtin ASTM Oil Centrifuge Tube, 100 ml, Short Cone Shape, for BS&W, as approved during June, 1960 meeting of ASTM Committee D-2, features permanent, fused-in white line graduations. Each tube is retested to insure accuracy. Graduated 0 to 0.5 ml in 0.05 ml, 0.5 to 2 ml in 0.1 ml, 2 to 3 ml in 0.2 ml, 3 to 5 ml in 0.5 ml, 5 to 10 ml, in 1 ml, 10 to 25 ml in 5 ml, and at 50 and 100 ml.

For more data on above item, circle E107 on postcard, Page 243

Curtin Hand Centrifuge has been modified to accommodate the new ASTM short cone shape centrifuge tube for BS&W as approved by ASTM Committee D-2 during the June, 1960 meeting. As in other models, centrifuge features rugged, lightweight cast aluminum body, stainless steel drive and pinion shafts. Spindle shaft is ball-bearing mounted and gears are bronze bushed to reduce friction to a minimum. Integral clamping lug has serrated gripping surface and is drilled to permit permanent mounting. Clamping screw has swivel-bearing washer on contact surface and heavy duty lever handle for easy tightening. Other models are available conforming to API Code 2500 and ASTM D96 specifications.

For more data on above item, circle E108 on postcard, Page 243

Cummins Engine Company, Inc.

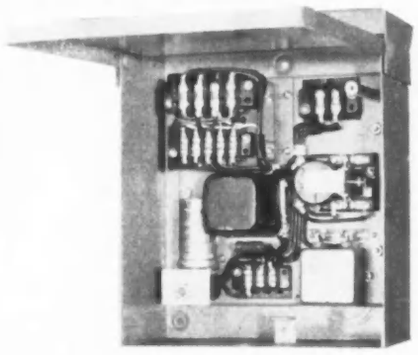


Cummins VT-12-G is the only integral diesel generator unit of its size, and combines new freedom of portability with the traditional dependability and quality of Cummins engines. The compact 600 horsepower diesel electric power unit is designed for drilling equipment. The continuous new horsepower rating is 435 at 1,800 rpm. A General Electric DC generator is pre-engineered for the unit,

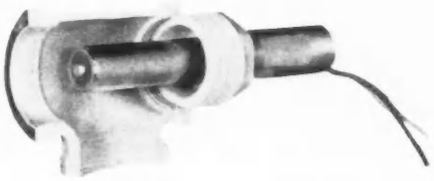
allowing the smaller, lighter weight engine to direct-drive the generator, which eliminates the need for a heavy reduction gear to reduce the speed to the traditional 1,200 rpm. The Cummins TURBODIESEL VT-12 is a twelve cylinder diesel engine with bore and stroke of 5⅛ inches x 6 inches, total piston displacement of 1,486 cubic inches. Two Cummins T-590 turbochargers utilize the energy of waste exhaust gases to increase horsepower without increasing weight.

For more data on above item, circle E109 on postcard, Page 243

Cutler-Hammer, Inc.



Oil Well Pump Off Control

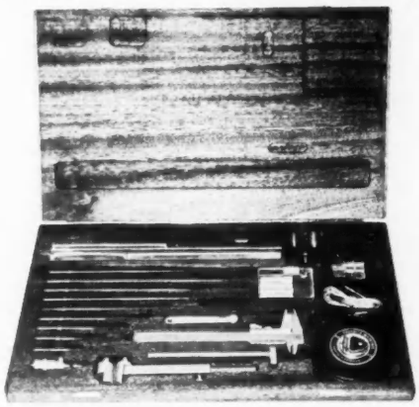


Pump Off Controller Probe

C-H Oil Well Automatic Pump-Off Control provides a practical method of stopping the oil well lift pump automatically whenever a well pumps off. Results show that pumping time can be cut up to 25 percent, thus insuring maximum production even on troublesome, erratic wells while eliminating needless mechanical wear and shock, and increasing equipment life. The control is basically a simple flow meter. The rate of flow is monitored by an electrically self-heated thermistorprobe installed in the lead line between the well head and the first check valve. The pulsating flow of fluid, delivered with each stroke of the reciprocating pump, gives rise to voltage pulsations across the thermistor. Upon pump-off, the fluid flow diminishes and a corresponding reduction in the signal from the thermistor occurs, causing a transistor controlled relay to stop the pump. Since pump-off is sensed by direct measure of fluid production, outside factors have no influence on its operation.

For more data on above item, circle E110 on postcard, Page 243

Daniel Orifice Fitting Company



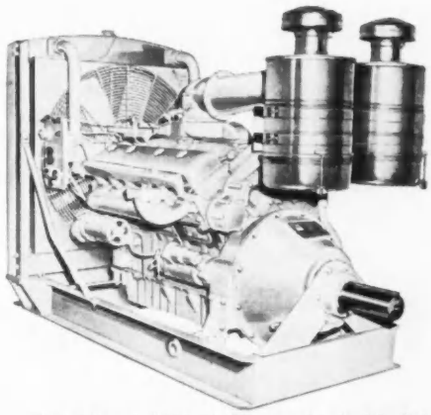
Meter Tube Check Kit is used for checking orifice metering assemblies against tolerances recommended by AGA and ASME. Custom-fitted mahogany carrying case holds 27 separate pieces including the Daniel "Bean" Orifice Edge Gage. With the Check Kit it is possible to measure meter tube diameters and lengths, meter tap holes, orifice plate bores, outer diameters, flatness and edge sharpness. Instruction sheets accompany each Kit. The kit, complete with "Bean" Orifice Edge Gage, can be purchased for $320. Without gage, the price is $235. Additional charge is made for export crating.

For more data on above item, circle E111 on postcard, Page 243

Detroit Diesel Engine Division General Motors Corporation

Series 53 Model 5025 Radiator Cooled Generator Set has maximum rating of 24 KW. It is 59 inches long, 26 inches wide, 38 inches high and weighs approximately 1,500 pounds. Other GM Diesel generator sets are rated up to 260 KW and come equipped with radiator or heat exchange cooling, AC or DC output, open or enclosed hoods, complete electrical instrumentations and a wide variety of electrical characteristics suitable for every petroleum industry need.

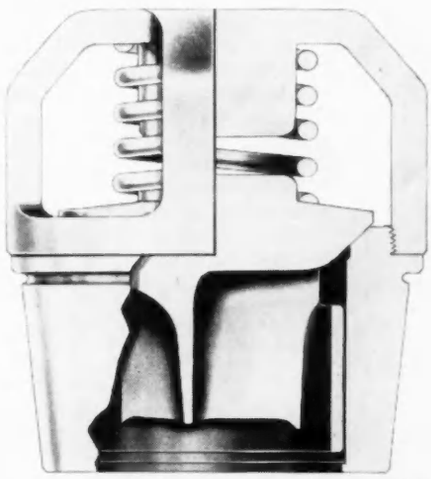
For more data on above item, circle E112 on postcard, Page 243



GM Diesel 12V-71 Power Unit Model 7124 has basic rating of 504 horsepower at 2,300 rpm. It is 96 inches long, 48 inches wide, 62 inches high and weighs approximately 4,700 pounds. Power units are also available in 6V, 8V and 16V models with basic ratings from 252 to 675 horsepower. Inherent weight savings of vee block configuration, shorter crankshaft, and careful attention to lightweight construction all combine to reduce weight per horsepower. Increased air inlet port area, and four exhaust valves per cylinder, provide more air flow for combustion and scavenging, greatly improving fuel economy. All models are available with clutch power take-off, GM Torqmatic Converters, long and short P.T.O. shafts, open or enclosed hoods and a wide variety of options to tailor unit to your job.

For more data on above item, circle E113 on postcard, Page 243

Dixell Development & Manufacturing Company

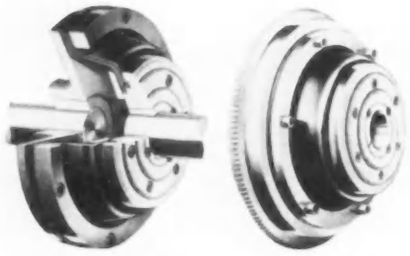


Self Cleaning FP-8C "True-Lift" Metal Valve is designed for corrosive service where pressure does not exceed 5,000 psi, such as in waterflooding, sour crude gathering lines, acid transfer pumps, high paraffin content crude handling, salt water disposal, and chemical transfer pumps. The vertical, horizontal, plunger pump valve features 45-degree metal-to-metal seats, "soft action" opening and closing, and straight line motion with the largest total valve guiding area. Vanes cast within the valve body rotate the valve and direct fluid flow to the large circumferential openings for rapid movement of large volumes, suiting the valve for pumps with low suction pressures. This assembly is furnished complete with seat, body, spring retaining cage, and springs—in standard materials of 18-8 type stainless steel with Monel springs. Other materials are available for special services.

For more data on above item, circle E114 on postcard, Page 243

Dodge Manufacturing Corp.

Custom-Type Para-Flex High Speed and Para-Flex Flywheel Couplings utilize a pan-shaped rubber flexing element. They are designed to operate at higher speeds and to transmit greater torque than the original standard Para-Flex. The



HIGH SPEED (PH) FLYWHEEL (PF)

new types are recommended to accommodate, either singly or in any combination, angular and parallel shaft misalignment and end float, to absorb torsional vibration, and to cushion shock loads. The High Speed Coupling consists of the flexible member supported on one side by a clamp-ring flange, with its larger side bolted to a steel disc, while the Flywheel Coupling is like the High Speed except that its larger side bolts directly to the flywheel of an internal combustion engine instead of being supported by a taper-bushed steel disc. Both couplings are offered in sizes to deliver up to 47 horsepower per 100 rpm and with Taper-Lock bushings to fit shafts up to four inches in diameter.

For more data on above item, circle E115 on postcard, Page 243

Dowell Division of Dow Chemical Company

Acid Guide provides a dependable guide for planning and predicting effectiveness of oil well acidizing treatments. Similar to recently released Frac Guide, the Acid Guide makes it possible to predict advisability of an acid treatment for a specific well, and probable production increase to be expected from any given acid treatment. Field results have shown a high degree of correlation with such predictions. In the past, some of the factors that have a direct bearing on cost of an acid treatment, and results obtained, have been hard to evaluate. Many different specialized acid mixtures are available and it is now possible to determine the best type of acid to use, its proper concentration, and the volume that will secure optimum results in a given oil producing formation.

For more data on above item, circle E116 on postcard, Page 243

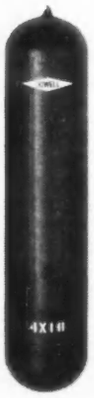
Flac Organic Fluid Loss Control Additive for Cement has shown excellent results in Gulf Coast cementing operations. When mixed into cement slurries, it prevents water in the slurries from escaping into the porous rock in the well. This keeps cement fluid until it reaches desired depth, permitting proper placement over a wide range of well conditions and facilitating cementing techniques. A unique advantage of this new fluid loss additive is its chemical inertness. It does not have an appreciable effect on slurry properties such as viscosity, thickening time, setting time, or set strength of the hardened cement. It has been used in many types of portland and bentonitic slurries, and at bottom hole temperatures as high as 310° F., and shown reliable and predictable fluid loss control under all conditions. It has made possible squeeze cementing long perforated zones which previously would have required many stages to seal off successfully.

For more data on above item, circle E117 on postcard, Page 243

Abrasijet Down-hole Jetting Service is performed by pumping a sand-fluid slurry, at high pressure, through a specially designed jet gun. The resulting high-velocity jet streams rapidly perforate casing and cement sheaths, and erode cavities deep in the formation itself. Principal applications: Perforate casing and cement—notch formation prior to acidizing or fracturing—penetrate plugged zones in vicinity of well bore—reduce "breakdown" pressure and provide "single-point" entry on fracturing treatments—initiate horizontal or vertical fractures—cut windows for whipstocking—cut off pipe—remove insoluble materials plugging face of injection wells—clean out or enlarge open hole. Over 2,000 Abrasijet treatments have been performed to date with a greater than 90 percent success ratio.

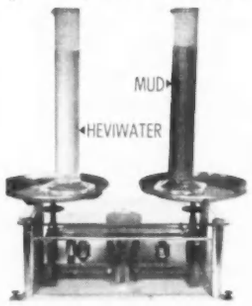
For more data on above item, circle E118 on postcard, Page 243

Rockshock Well Stimulation Service consists of imploding a glass capsule while suspended in a well-bore under pressure. Resulting shockwaves clean out well perforations and flow channels, and initiate numerous multiple fractures in the formation immediately adjacent to the implosion. This is an invaluable device for lowering formation "breakdown" pressures, and has made possible fracturing wells that otherwise would not have been so completed, due to pressure limitations. The glass capsule is suspended at the proper depth, and hydraulic pressure applied through surrounding fluid. When yield point is reached, capsule collapses and fluid rushes into resultant cavity. At the center, a powerful shock wave is produced which travels outward, impinging with great force on the formation, and producing desired effects.



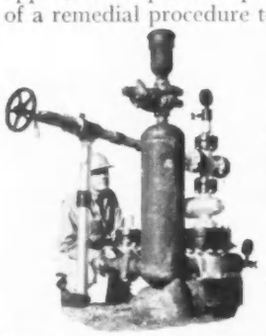
For more data on above item, circle E119 on postcard, Page 243

Heviwater High Density Well Completion Fluid, to avoid use of mud above packers, offers all the advantages of brine completion with the additional advantages of being premixed and containing an extremely effective corrosion inhibitor. It is ready for use as purchased, with no further processing or mixing. Heviwater is available in a variety of specific gravities. Its weight helps to control the well during completion, and to relieve the packer of upward pressures after completion. Its built-in inhibitor protects metal well equipment against severe corrosion. Heviwater also makes an excellent protective fluid for use during perforating operations because it is free of solids. The danger of formation plugging due to particle infiltration is thus minimized. It facilitates further workover operations on the well because it does not settle or "set up."



For more data on above item, circle E120 on postcard, Page 243

Depban Paraffin Inhibitor offers a new approach to paraffin problems. Instead of a remedial procedure to remove paraffin deposition which has already taken place, this material acts as a preventive measure to eliminate or minimize accumulation of such deposits on down-hole equipment. Success of the inhibitor depends upon proper application of chemicals, and requires that the well be cleaned of existing deposits prior to treatment. All metal parts must be free of oil, wax and paint so an effective inhibitor film may be laid down. After initial application, regular periodic addition of the inhibitor prevents adhesion of paraffin particles to clean, water-wet surfaces. The inhibitor is easy to handle, nonflammable, and is completely harmless to refinery processes.



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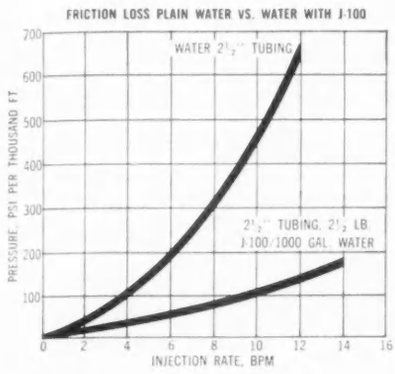


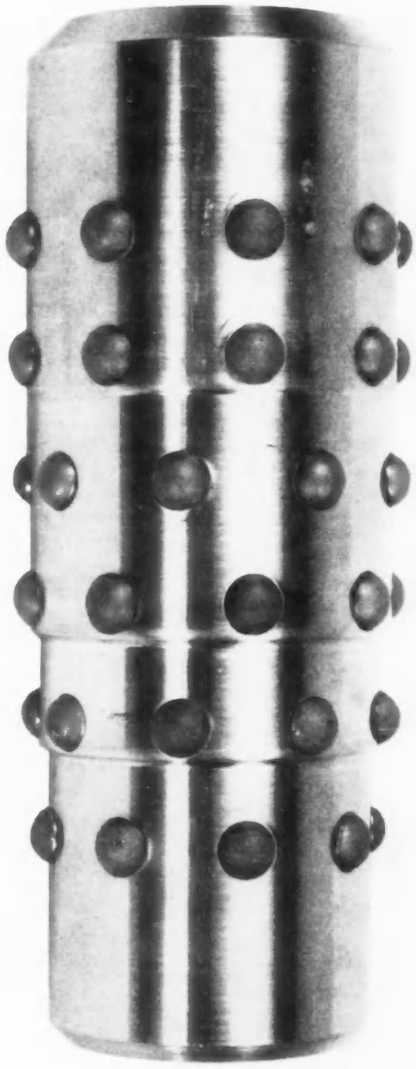
Slick Water Low-Friction-Loss Frac Additive, (J100), reduces cost of formation fracturing by cutting horsepower requirements. Used in water, brine or acid, J100 imparts an unusual "slickness" to these fluids. Thus, friction losses experienced while pumping frac fluids at high injection rates through tubular goods, are greatly reduced. This makes possible higher injection rates at the same or lower pump pressures than were previously possible.

For more data on above item, circle E122 on postcard, Page 243

Drilco Oil Tools, Inc.

Drill Collar Shock Absorber is finding wide application in the rough running areas of the Mid-Continent United States. Tool is run between bit and drill collar string to absorb excessive "bounce" and vibration from a bit drilling in rough formation, utilizes a rubber element to absorb shock loads. Tools are available for 12¼-inch, or larger hole sizes. Designs are now being tried for 9-inch and smaller holes. Indications are that fewer bits are required to drill same amount of footage when Shock Absorber is used. Apparently the tool decreases impact loading on bit bearings and reduces tooth breakage. At present the tools are handled by Drilco on a rental basis, however, plans are being made to sell the Shock Absorber direct to the user when present field development program has been completed.

For more data on above item, cir E123 on postcard, Page 243

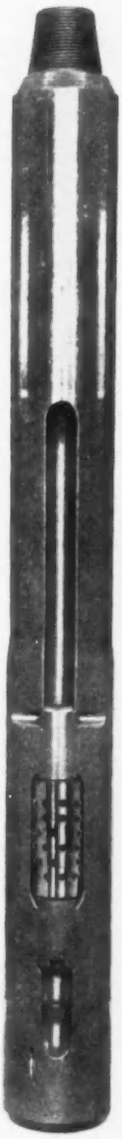


Drilco Knobby Reamer Cutter is designed for use just above the bit to insure a full gage hole while drilling harder formations. New type cutters utilize tungsten carbide compacts for cutting surfaces, incorporate new materials in bearings to insure longer life. In hard formation drilling, one set of Knobby reamer cutters will outlast six to ten sets of standard cutters. This insures operator a full gage hole in which to run new bits. Experience has shown many bits drilling in hard formations are "pinched" and give inferior performance because of undergage hole conditions. Cutters are presently being used in Permian Basin of West Texas and New Mexico, the Mid-Continent fields in Oklahoma and Arkansas, and more abrasive foothills drilling in Canada. In addition to use in mud, it has been found that long runs can be made in air and gas drilling.

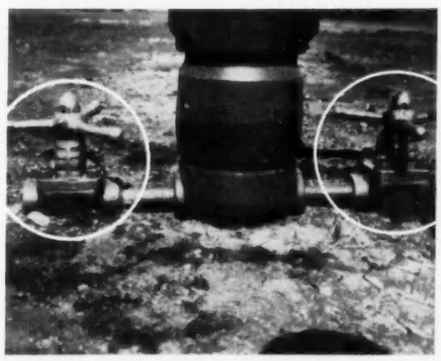
For more data on above item, circle E124 on postcard, Page 243

Model 60 Three Point Reamer is designed to be run just above the bit to prevent loss of gage. Features of new design are drive-fit body blocks, larger diameter bearing pins, and a wider range of reamer cutters for various formations. Drive-fit body blocks assure that all maintenance on the body can be performed by drilling crews at the rig. This means bearing blocks can be replaced without machine shop facilities by merely driving out the worn blocks and installing new ones. Larger reamer pins insure longer cutter life by providing more bearing area. Cutters available for Model 60 body are type "V" for softer formations, type "Q," a chert type cutter for harder formations, and type "K," the new Knobby reamer cutter for extremely hard drilling and air and gas drilling. Model 60 should prove advantageous in remote areas where all maintenance must be done by the rig crew.

For more data on above item, cir E125 on postcard, Page 243



Drilling Equipment Manufacturing Company



1000-Series Gate Valve, a lower-pressure gate valve, features the same advantages as Demco's high-pressure "Mud King" line. The 1000-Series is available in 1,000 psi working pressure or 3,000 psi test. It is available in two, three and four-inch sizes and in screwed, flanged, grooved, and weld-end connections. Lower-pressure valves feature same

spread ring seat construction as Demco "Mud King" valves now being used for 2,000, 3,000 and 5,000 psi working pressures. Like these models, the new valves also feature ease of operation under pressure, faster opening and closing and a simpler inspection and parts-replacement operation.

For more data on above item, circle E126 on postcard, Page 243

Demco's Mud King has been introduced, through a successful five-year development program, to a broad group of production applications, an entirely new field of potential for the valve. It has proved highly effective in waterflooding, hydra-frac, acidizing and cementing services. It is equally well suited to many other high-pressure applications in which temperatures do not exceed a 250-degree maximum. Originally designed to offer a drop-tight closure against the highest mud line pressures, the Mud King has proved so dependable against the high-abrasive content of drilling muds that it is practically indestructable when applied to less-abrasive activities.

For more data on above item, circle E127 on postcard, Page 243

Demco "Uni-Seal" Butterfly Valves offer positive shutoff of all liquids, gases and slurries. They are available in two series for more versatile performance. Series W was introduced to fill demand for a valve which may be used between two standard 150-pound ASA flanges. Available in the six-inch size, it may be purchased complete with flanges or as a single body section only. Series D is available with screwed, weld or grooved-end adapters, in two-, three- and four-

BUTTERFLY VALVE SERIES D

BUTTERFLY VALVE SERIES W

inch sizes. The principle of the "uni-seal" action, featured in both valves, provides a specially-contoured resilient seating surface which is molded to form a matching spherical engaging seat for the disc in the near-closed position. A positive shutoff actually occurs before the disc is turned to final closed position, or even if turned past normal closed position.

For more data on above item, circle E128 on postcard, Page 243

Duff-Norton Company

MA Series Sealed Ratchet Lever Hoists in five models feature a brake chamber neoprene-sealed in five places against oil, water, dirt, and chemicals. The new hoists, with capacities ranging from ¾-ton to 6 tons, provide safe, dependable hoisting power under exposure conditions. Overload protection is in the exclusive Safety Handle which bends to indicate an over-capacity load before the chain breaks or hooks open. Another safety feature is the protected location of the free chain control to prevent accidental tripping. The hoists will not free chain when loaded. The high strength and lightweight aluminum alloy frame makes it easy to transport. Precision load spotting within fractions of an inch is easily accomplished. The up and down control is placed high on the handle. It will not interfere with operator's hand when he uses shorter leverage for greater lifting speeds.

For more data on above item, circle E129 on postcard, Page 243

RA Series Ratchet and Pawl Aluminum Lever Hoists are available in six models with rated capacities of from ¾-ton to 6 tons. These new, lightweight, high-strength, compact hoists have low head room and a standard lift of five feet. Bodies and handles in these link chain type hoists are made from a special aluminum alloy. Open body construction permits easy inspection of suspension hooks. Operation is possible from either side and dis-assembly or re-assembly is easy in cramped quarters. Special self-lubricating, ball-thrust bearings permit easy load rotation. A double pawl arrangement assures operators that one pawl is always engaged with the ratchet during lifting or lowering. An exclusive safety handle bends to indicate overloads and to avoid chain or hook failures. The handle will not ratchet if a load is released unintentionally. Long service life is provided by high tensile material in the chain guide. Load sheave and chain are heat treated for maximum wear.

For more data on above item, circle E130 on postcard, Page 243

Ram-Pac Rams in RC and AH Models provide an instant source of power for heavy moving, lifting, pushing, pulling gears, adjusting, testing, or bending. Capable of applying from 10 to 100 tons of force in any direction, the 12 models in the Ram-Pac line can be used as permanent or temporary installations for field or plant use. The bodies of the RC Models are high-grade castings and their plungers are of steel bar stock. AH Models have bodies and plungers of seamless steel tube. "Grit Guards" eliminate danger of dirt, water and foreign material entering the ram. All heads are heat treated for long wear. Five Ram-Pac hand or power pumps, including two hand, one air, one electric and one gasoline, are available for use with Ram-Pac Rams. They are all designed to provide easy, safe, efficient sources of power for the rams. Attachment units and accessories for all models are available.

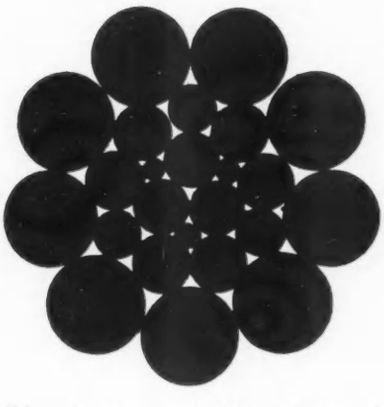
For more data on above item, circle E131 on postcard, Page 243

E. I. du Pont de Nemours & Co.

Plastic pipe designed for oil field service is made of "Delrin" acetal resin, a major new engineering material developed for use in many applications traditionally served by metals. The pipe is covered by a patent. Among its features is a simple, rapid heat-fusion fastening method which yields a strong integral joint. Field tests with eight oil companies covered more than 20 oil field surface line pipe installations. They revealed potential applications to include flow lines, gathering lines, salt water disposal and water flooding lines. "Delrin" is a rigid thermoplastic combining high strength and toughness with excellent fatigue endurance under pressure surging conditions. It has outstanding solvent resistance and dimensional stability over a wide temperature range. As a result, rigid pipe for oil field service is one of the outstanding uses for the new material.

For more data on above item, circle E132 on postcard, Page 243

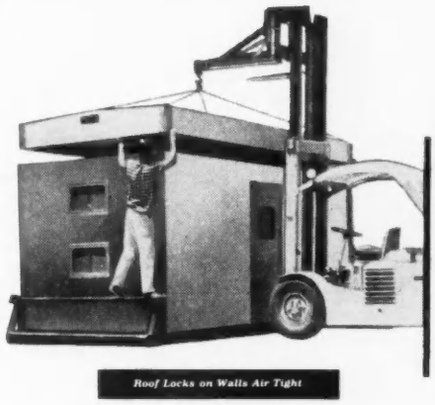
Edwards Wire Rope Company



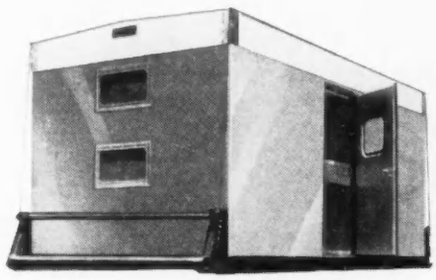
Edwards Diamond SSS Grade wire ropes, in new 24-wire Special Seale constructions, provide not only greater strength, but actual longer safe service. Extensive field testing proved that particular strand patterns, combined with selected grade of wire, resulted in wire ropes which were not only strong but also had superior external wear resistance. In many cases it was found that, if there were no broken outside wires, average strength at time of retirement was about 97 percent of original rope strength. Wire ropes particularly suited to this new Diamond SSS Grade are: 6 x 24 Special Seale; 6 x 26, 6 x 31, and 6 x 36 Warrington-Seale. All Diamond SSS wire ropes are made with an independent wire rope core. In the 1-inch and 1⅜-inch sizes they are now gaining extensive use as rotary drilling lines and casing lines.

For more data on above item, circle E133 on postcard, Page 243

Elder Trailer & Body, Inc.



Roof Locks on Walls Air Tight



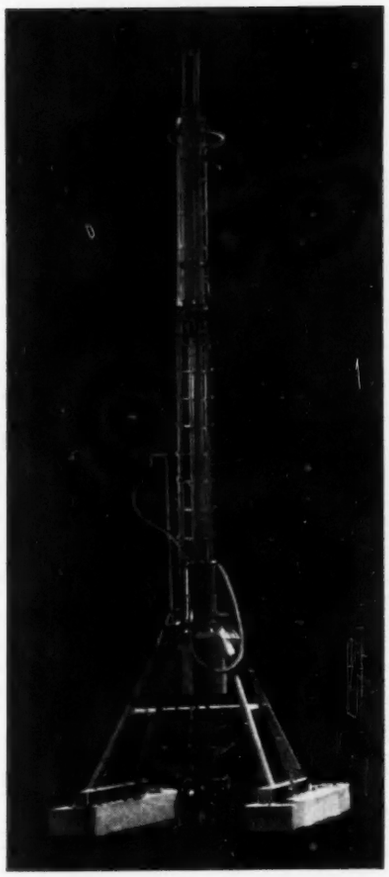
Erected Unit Provides Year 'Round Living Comfort

Eight "Knocked-Down" Units Loaded and Ready for Shipment

Elder "Knock-Down" Field Housing Units save up to 80 percent on shipping costs. Quick to erect, quick to "knock-down," easy to handle, easy to load. Provide economical, year-'round living comfort for field crews. Equipped with rugged steel skid (or mounted on wheels for trailer use), treated wood frame, aluminum over plywood walls, one-piece leak-proof fiberglass roof, heavy duty plywood floor, mahogany interior paneling, weather-proof windows and doors, screen doors. Units may be air conditioned or heated. Any interior furnishings or equipment supplied on request. Low priced model available for native housing. Sizes 8 feet x 16 feet—8 feet x 20 feet—10 feet x 16 feet—10 feet x 20 feet.

For more data on above item, circle E134 on postcard, Page 243

Engineered Oil Tools, Inc.



EOT-Johnston Rod Counter-Balanced Pumping Unit has brought about an engineering "break-through" for the hydraulic pumping method. The company has developed a new four-way valve that eliminates charging the hydraulic pump suction. This means that the economics of hydraulic pumping can be applied to any well, regardless of depth or volume of fluid to be handled. The new EOT-Johnston unit can handle multiple completions and can pump economically offset wells up to 160-acre spacing. It is the newest product in EOT's line of engineered production equipment.

For more data on above item, circle E135 on postcard, Page 243

Engineering Enterprises, Inc.

No-Wall-Stick Drill Collar is designed to reduce the sticking of the collar string due to differential pressure forces. The effective reduction of these forces is accomplished by decreasing 40 percent the total contact area of the drill collar body and the wall of the bore hole. Also, drilling mud hydrostatic pressure is allowed to equalize around the collar body, each foot along its length. The fluid spirals are actually convex surfaces which prevent the drill collar from balling up and also result in only a 4 percent loss of drill collar weight. At present this type of drill collar is available on rental in the Texas-Louisiana Gulf Coast area in 6-inch, 4¾-inch and 4⅛-inch sizes. Any

size of new or used drill collars owned by oil companies or drilling contractors may be converted for a fixed conversion charge.

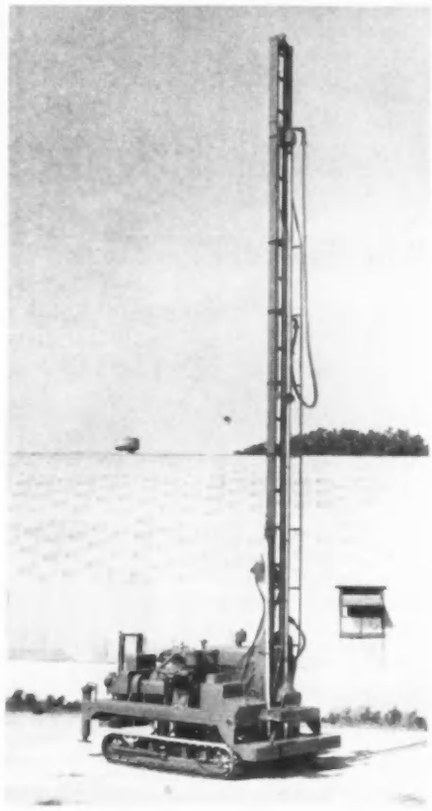
For more data on above item, circle E136 on postcard, Page 243

George E. Failing Company

Failing FP-3 Rig is a combination unit equipped with both air compressor and mud pump for drilling with air or mud. It is designed for petroleum production or exploration to depths of 2,000 feet. The rig is suitable for mounting either on truck, trailer or crawler and it may be driven either from the truck engine or a powered unit mounted on the drill. The choice of pumps includes either a 5 x 6, 5 x 8 or 5 x 7½ or a centrifugal type. Features include a 30,000 pound pulldown; retractable rotary table; air controls, 10 speed transmission, 2-speed drawworks, hydraulic leveling jacks. Another special feature is a new and quick method of repacking the water swivel. The air compressor may be either a Le Roi 100-S1 or 100-S2, air cooled, six cylinder, reciprocating type.

For more data on above item, circle E137 on postcard, Page 243

Failing Model RB-2 is a self- contained drilling rig for seismograph work, designed for one-man operation. It uses both conventional rotary or drag type bits or down-the-hole percussion tools. The hydraulically actuated chain pulldown feed mechanism for drilling hard formations is capable of applying 10,000 pounds to the bit, and rotary speeds of 40 rpm to 250 rpm are available. The



drill is self-propelled and may be mounted on either a track type crawler or pneumatic tired wheels. Holes ranging in size from 1¾ inches to 4½ inches may be drilled to depths of 25 feet to 30 feet in a single stroke. The mast has an overall height of 34 feet and is raised and lowered hydraulically by two double acting cylinders.

For more data on above item, circle E138 on postcard, Page 243

Fann Instrument Corporation

Fann Multi-Kit is a portable laboratory for testing drilling fluids. All components are housed in a stainless steel case 17 inches long, 7½ inches deep, 12½ inches high. Weight complete, 38 pounds. Equipped with a handy carrying handle, this is an ideal kit for use in airplanes, cars and helicopters. An adjustable rack with elastic tie-down straps is available for semi-permanent mounting in automobiles. Contents: 1 Model

34 V-G Meter, Hand-Cranked or 12 Volt; 1 Minipress with accessories; 1 Ministill with choice of two heater assemblies and accessories; 1 Sand Content Kit; 1 interval timer; one 10 ml pipette; two 5 ml pipettes; 1 stirring rod; 1 pkg. paper; 1 titration dish; 1 syringe; eight 6 oz. bottles, chemicals; 5 small bottles, chemicals.

For more data on above item, circle E139 on postcard, Page 243

Fann Resistivity Meter, Model 88-A, now has a visual null indicator. This not only makes the meter easier to operate, but provides more accurate readings and makes tests possible in noisy locations. Operation is simple, just turn the calibrated knob until minimum reading shows on meter and read resistivity directly. It is available at no increase in price over the previous model.

For more data on above item, circle E140 on postcard, Page 243

Fann Consistometer, Model TDL, utilizes an entirely new measuring principle, and thus provides the utmost accuracy and portability for testing cements. Being entirely self contained, it can be

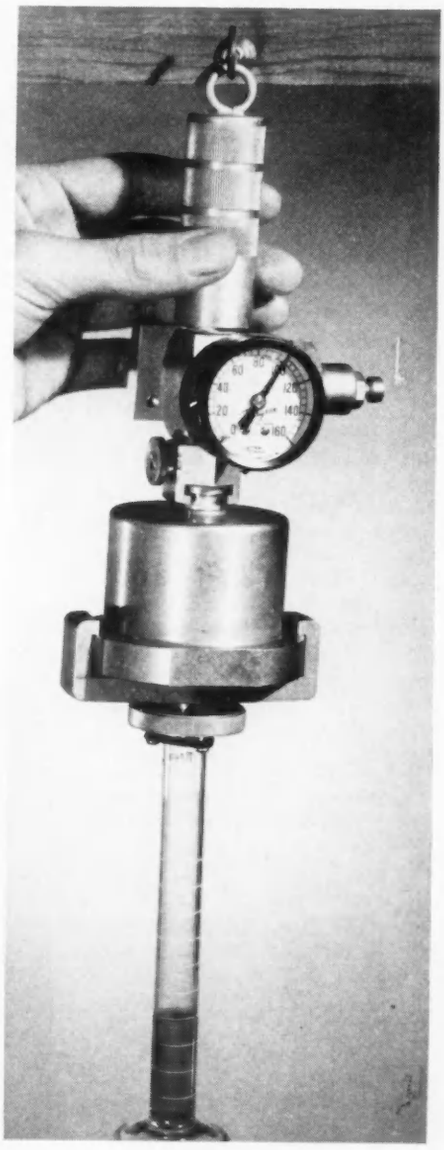
used with equal ease in both laboratory and field. Pressure can be varied from 0 to 16,500 psi and temperatures up to 350° F. are available. All seals and closures are designed to be made up hand tight so that test can be started quickly after mixing. Thickening times are permanently recorded on reproducible chart. Available for 115 volt 60 cycle and 230 volt 50 cycle operation.

For more data on above item, circle E141 on postcard, Page 243

Fann Minimix is a battery powered mixer for pilot testing fluids in the field, 12 volts AC-DC. It eliminates many shortcomings of previous field mixers, is powerful enough to thoroughly mix the thickest drilling muds. The sample cup is unbreakable polyethylene and sealed so there is no splashing. It is transparent for visible mixing and is graduated at 175 and 350 cc for barrel equivalent volumes. All parts that contact the fluid are either stainless steel or plastic, insuring easy cleaning and freedom from corrosion. The assembly is well balanced to prevent vibration at high speeds, 7,500 rpm maximum. Minimix is 8 inches high by 3½ inches diameter. Weighs 3½ pounds. Comes complete with service cord and plug.

For more data on above item, circle E142 on postcard, Page 243

Fann Minipress, designed for minimum size and weight, is handier to use and more accurate than earlier filter presses. The normal back-up screen has been re-



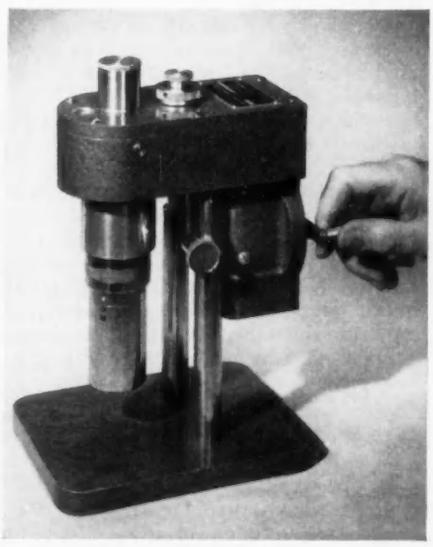
placed by a grid which is an integral part of the base plate. Hold up or filtrate in the screen and drain tube has been reduced to a minimum, accounting for the high accuracy. Carbon dioxide cartridges are used for the pressure which is regulated to 100 psi by an extremely small mechanism. Input, shut-off and bleed valves are all incorporated in one simple, long lasting assembly. Instrument is 8¾ inches high by 3¼ inches diameter. Weighs less than 3 pounds.

For more data on above item, circle E143 on postcard, Page 243

Fann Ministill is a small, lightweight portable still used to determine percentages of oil, water and solids in drilling fluids. Heat is applied directly to the sample fluid. This eliminates bulky insulation and permits balancing heat input and loss to prevent heater burnouts. Operates on 12, 115 or 230 volts. Twelve

volt heaters operate from car battery with less drain than car lights. Highly accurate, because it uses large test samples and provides adequate heat to distill the heavier oil fractions. Rugged, because case, retort and heater assembly are of stainless steel. Measures 5 inches by 6 inches by 9 inches. Weighs only 8 pounds. Shipped complete with illustrated accessories, including one spare heater.

For more data on above item, circle E144 on postcard, Page 243



Fann Hand Cranked Viscometer, Model HC 34, is completely portable for field service. The drive is available either as an attachment for existing Model 34's or completely installed and adjusted on new instruments. About the same size and weight as the standard electric motor, this device eliminates the need for bulky storage batteries, power packs and transformers. The speed control utilizes a new design which regulates with amazing accuracy, and speeds do not change with wear. An exact speed ratio obtained through the standard gear shift, gives spindle speeds of 300 and 600 rpm. This

is absolutely necessary if accurate determinations of plastic viscosity and yield value are to be calculated by the rapid two-point method. Dimensions and weight are the same as Model 34.

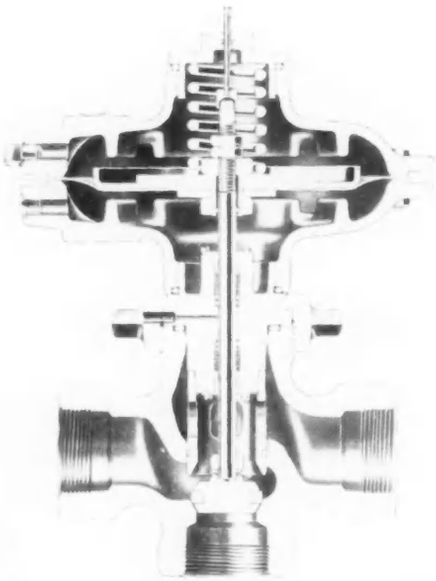
For more data on above item, circle E145 on postcard, Page 243

Fann Emulsion Tester, Model 23-A, gives continuous evaluation of emulsion. Indicates whether water in oil, or oil in water. Gives reliable indication of stability of invert emulsions. Ideally suited to field testing, or in combination with suitable electronic circuitry, Model 23-A becomes the control element of an automatic programmer or readout system. Voltage readings give a direct and reliable indication of particle size. Time consuming microscopic techniques for determining micelle growth or agglomeration can be avoided and testing time minimized. Perfectly suited to pilot testing of large numbers of secondary treating agents while an emulsion is undergoing mixing at varying shear rates.

For more data on above item, circle E146 on postcard, Page 243

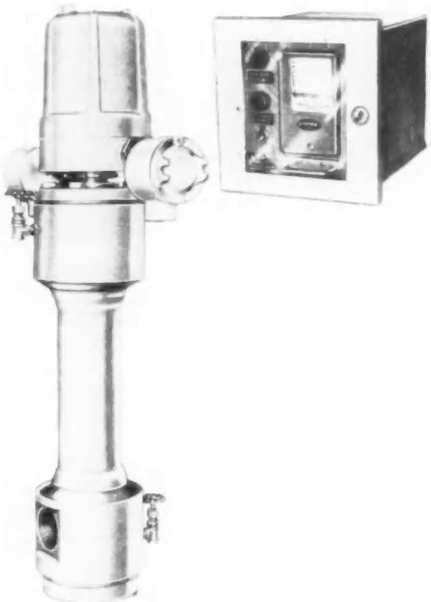
Fisher Governor Company

Type 1664 Three-Way, Two-Position Diaphragm Control Valve is designed for oil production work. It is 2-inch size, with screwed or grooved end connections. The cast iron body has a 400 psi WOG rating. The 1664 body can be converted into a single seat globe or angle body by plugging one of the outlet ports. A hammer lug union nut connects the body and bonnet. Removal of nut allows internal body parts to be removed through the body top without removing it from the line. The lower seat is machined in the body; the upper seat is formed on a cast iron cage screwed to the bonnet.



A poppet disc type plug with bonded Buna N disc provides tight shut-off. Spring opposed or pressure balance topworks are available. The spring opposed topwork is reversible in the field to give fail-open or fail-close action.

For more data on above item, circle E147 on postcard, Page 243



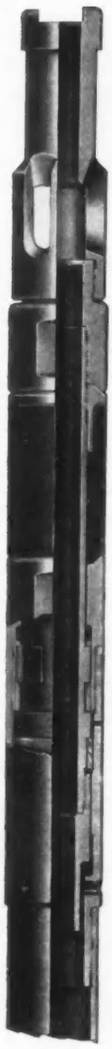
B. S. & W. Monitor (Basic Sediment and Water), is a new, improved capacitance type unit which measures 0-2 percent B.S. & W. content. It consists of a Type 4450 Sensor and Transmitting assembly, and a Type 705 or 706 Diverter Controlled. The sensor measures the dielectric constant of crude oil as it comes from separators or treaters. The transmitter sends an electric signal to the diverting controller. When water is present in the crude, the signal to the diverter instrument will be increased. If this exceeds the present conditions of the diverter, the instrument will actuate a diverting valve to reroute the crude back to the treater or storage tanks. Type 4450 is available with 2-inch threaded or 4-inch flanged end connections. A temperature compensator assembly is standard in each sensor. Type 705 has a Rustrack 31-day recorder of B.S. & W. percent; Type 706 has an indicator. The equipment does not require co-axial cable.

For more data on above item, circle E148 on postcard, Page 243

Type 667-HC Automatic Control Valve is designed for flow and pressure control service, primarily in indirect heaters. It has an angle steel body which incorporates an extra long outlet section with a smooth machined outside diameter to permit the control valve to be mounted through the heater shell for connection to the tubing bundle. The valve body is available with 2-inch female NPT ends or pipe butt-weld ends. The body to bonnet connection is made with a steel hammer lug union nut. This allows internal parts to be removed through the top of the body without removing it from the installation. A cage construction houses the cage, valve guide and seat ring. The inner valve is a Micro-Form style. A safety lock is also included as standard construction. This prevents removal of nut while the body is still under pressure.

For more data on above item, circle E149 on postcard, Page 243

Fluid Packed Pump Co., Division of The National Supply Company



Oilmaster Automatic Top Seal features several innovations over previous models. This tool attaches directly to the top of a stationary barrel bottom anchor (RWB) rod type pump and the seal is actuated automatically by the rod weight while the pump is being seated. Features of the new model include a steel reinforced seal element that cannot strip off when pump is unseated; anti-swivel splines to permit clutching the pump to the sucker rod string; a controlled expansion rubber that will not release accidentally by the plunger bumping up. Size of the drain holes has been increased to permit extremely rapid by-passing of fluid when the pump is unseated. The Automatic Top Seal eliminates the hazard of stripping jobs caused by sand settling around the outside of RWB pumps. Its further advantage is in centering the top of the pump in the tubing string, thereby minimizing plunger rod wear.

For more data on above item, circle E150 on postcard, Page 243

Foote Bros. Gear and Machine Corporation

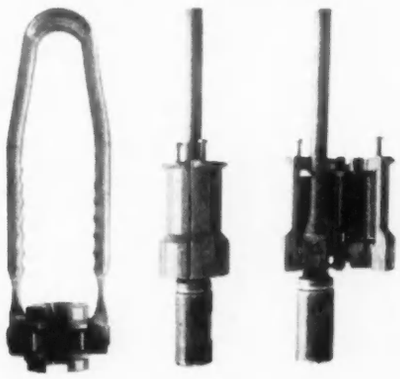
Fixed-Based

Radicon Fan-Cooled Speed Reducer with Universal Mount is a small-size fan cooled worm gear reducer adapted to field power requirements. Features include: Fan-cooling to promote maximum thermal capacity, and detachable feet to give unlimited mounting flexibility. The units are available in 12 sizes with center distances from 1⅛-inch to 8-inch, with input capacities from .01 to 68 horsepower, and with output torque up to 46,000 pound-inch. Speed ratios are available from 5:1 to 70:1. Adoption of involute helicoid worm thread design permits precision inspection and calibration during manufacture, which results in highest load carrying capacities coincident with superior efficiencies, long life and quiet operation. Gear tooth design also insures positive lubrication, regardless of drive direction or operating speeds. In addition to convection, heat is dissipated through radiation, assisted by vertical ribbing on the unit. Cooling is equally efficient at any mounting position, with thermal and mechanical ratings identical in most cases. For infrequent or intermittent service, thermal ratings can be ignored.

Adaptable

For more data on above item, circle E151 on postcard, Page 243

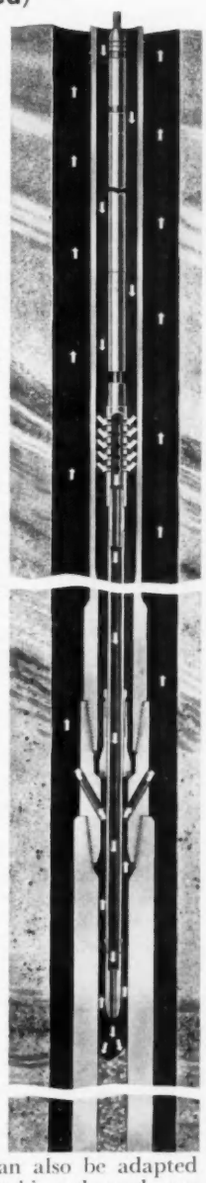
Foster Cathead Company



Slim Elevators and Latch Type Rod Wrench enable the Foster Tubing Tong to run ⅝, ¾, ⅞, 1 and 1⅛-inch rods. The elevators are designed to pass through the tong head enabling the tong to stay on the string of rods for the entire trip. The rod wrench slaps quickly onto the square of the rod for a gripping surface. Same rod wrench jaws will run 3½-inch tubing. Other jaws are available to run 4½-inch and 5½-inch pipe.

For more data on above item, circle E152 on opstcard, Page 243

The Dia-Log Company (Gulf Coast and Mid-Continent) Ford Alexander Corp. (California area)



Dia-Log Hydraulic Clean-Out Tool provides simple, positive means for cleaning out bridging or plugging material lodged in stuck drill pipe or drill collars. Tool consists of 200 feet of 1⅜-inch OD flush joint pipe, run into well on wire line, and equipped with sliding packing gland that diverts circulating fluid from rig pumps into upper end of the tool. After passing through the Clean-Out Tool, circulating fluid is discharged through a nozzle in the bottom, thus creating a high velocity jet of fluid that washes away the bridge as tool is lowered into stuck drill pipe or drill collars. A special down-hole sub can be provided which incorporates a seat for the packing gland and ports for return circulation. Removal of the bridge permits subsequent use of Dia-Log Free Point Indicator and Back-Off String Shot to aid in complete recovery of stuck pipe. The tool can also be adapted to cleaning out tubing through use of swab cup pack-off which eliminates need for a down-hole sub.

For more data on above item, circle E153 on postcard, Page 243

1⅜-inch OD Free Point Indicator is now available, in addition to the standard 1⅝-inch OD tool, to locate the deepest recovery point of stuck pipe. The new tool is designed to operate through openings as small as 1½-inch ID. It may be run alone or in combination with a 1⅜-inch OD Collar Locator and String Shot Back-Off Assembly to both "Free Point" and "Back-Off" the pipe in a single run of conductor cable. A portable instrument panel is also available so that tool can be run from any conductor cable truck or offshore skid unit.

For more data on above item, circle E154 on postcard, Page 243

Franks, Cabot Corporation, Machinery Division

Triangular Tri-Scope Derrick replaces the double pole mast where it is desirable to pull doubles for rod and tubing work. It gives greater speed with automatic positioning rod and stacking boards, greater strength with less weight. Rated 100,000 pounds with 2-to-1 safety factor. 90-foot derrick. Single hydraulic ram raises mast.

For more data on above item, circle E155 on postcard, Page 243

Gardner-Denver Company

Gardner-Denver "2100" Drawwork's hoist and transmission are combined into a compact one piece unit. Complete drawworks can be moved in one load. Drum core is 60 inches long by 36 inches diameter, capable of spooling 93 feet of 1½-inch drilling line in less than three layers. Total capacity is 4,100 feet of 1½-inch line. 330 degree wrap around bands with tension type equalizer give proper brake feel to driller. Twenty-six 12-inch x 12-inch brake blocks provide a total of 3,744 square inches of braking area. Transmission is compact two-shaft design, enclosed in an oil tight spray lubricated case in rear of drawworks housing. Four forward speeds and reverse gears are air actuated at drillers position. High capacity, triple plate, air actuated Twin-Disc clutches provide compact torque transmission to transmission drum and rotary table. Controls are located at driller's position in compact control panel.

For more data on above item, circle E156 on postcard, Page 243

Gardner-Denver Rotary Table has smooth running, spiral-bevel main gear and one piece cartridge type pinion shaft assembly enclosed in a streamlined fabricated steel housing. Top of table housing is constructed of one inch non-skid steel floor plate. Hazardous stumbling blocks, such as filler plugs and bolt heads are eliminated for maximum safety to the drilling crew. The pinion shaft is mounted in its cartridge on a straight roller bearing at the sprocket end. These heavy-duty bearings are individually grease lubricated. Main table bearing is oil bath lubricated. Lubrication fittings are centrally located on the end of the housing opposite the sprocket end. Internal working parts are protected from contamination by triple labyrinth, upper mud seal, and a positive lower mud seal.

For more data on above item, circle E157 on postcard, Page 243

Gardner-Denver Traveling Block has a "tear-drop" shape, designed to eliminate all possibility of snagging. Low center of gravity provides perfect balance for straight and easy movement during raising and lowering. Fabricated steel sheaves and tapered roller bearings are mounted on a center pin made of high strength SAE 4145 alloy steel. This center pin is supported by side plates cut from rolled steel plate and reinforced around the bearing opening. Each sheave bearing can be individually lubricated through rifle drilled holes in the center of the pin from either side of the block. Heavy steel sheave guards are secured to side plates by "through pins," both top and bottom, for easy removal. Clevis position and construction allow blocks to be raised to vertical position while hook remains horizontal on rig floor. While comparatively small in dimension, these compact traveling blocks are large in tonnage capacity.

For more data on above item, circle E158 on postcard, Page 243

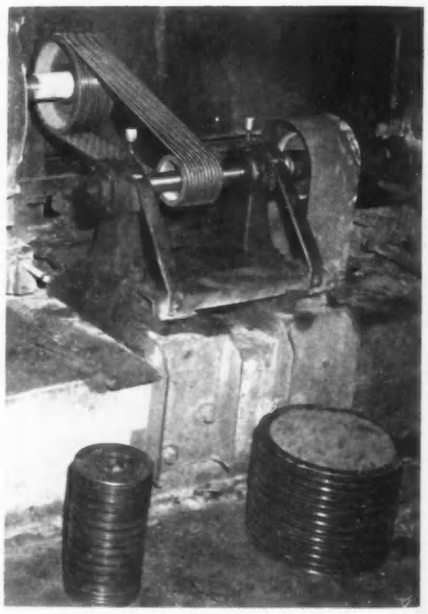
Gardner-Denver PN-7 Mud Pump is a highly developed Scotch yoke plunger pump for slim hole, deepening, diamond bit and core work with high pressures and lower volumes. The PN-7 features heavy duty bronze sleeve main and eccentric bearings. Large diameter eccentric construction. Sealed power transmission case to exclude mud, water and dirt. Lower jackshaft for direct coupling input power. Lubricated by positive pressure to all bearing surfaces except jackshaft bearings which are pressure grease lubricated. Force feed lubrication to plunger packing. Special hard surfaced long lived plungers. Shipping weight is 14,700 pounds, and height is 5 feet 4 inches.

For more data on above item, circle E159 on postcard, Page 243

Gardner-Denver PO-7 Mud Pump is a six cylinder plunger model developed for high pressure jet bit drilling and for drilling to extreme depths. Scotch yoke design provides a compact rugged crankcase. It also affords plunger pumping action off both sides of the eccentric which permits six plungers to operate off a three-throw eccentric. The pump can be operated with full power through either or both sides. The pump is manifolded to operate with either or both sides on the hole, or by-passed to the mud pit. Shipping weight is 25,000 pounds, and height is six feet.

For more data on above item, circle E160 on postcard, Page 243

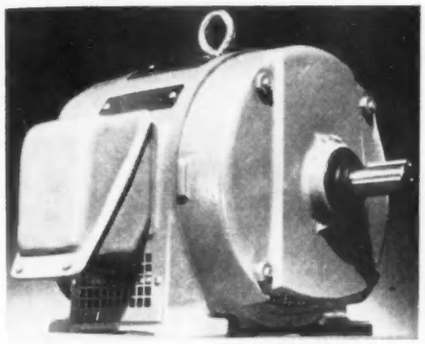
The Gates Rubber Company



Super High Capacity V-Belt Drive is a compact power transmission design that allows substantial savings in space and weight, often at a savings in cost. The stronger, smaller V-belts reduce cross section dimensions up to 50 percent. Narrower belt top width and groove spacing reduce sheave face width 30 percent to 50 percent, which lessens bearing loads considerably. The added belt strength allows smaller diameter sheaves and shorter center distances. Because sheave diameters and widths are decreased, both drive and shipping weights can be reduced in many cases. Belt and rim speeds up to 6,000 fpm are possible without dynamic balancing of sheaves, permitting the use of smaller, high speed motors. An arched top on the belts prevents distortion of tensile section of belt, giving uniform distribution of loads on the cords. Concave sidewalls distribute wear evenly. Length stability ensures that all belts are matched.

For more data on above item, circle E161 on postcard, Page 243

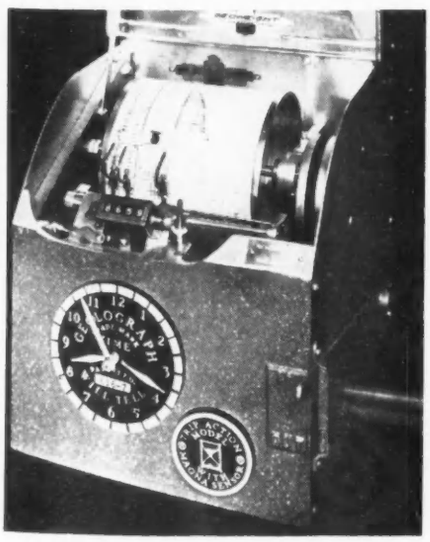
General Electric Company



Tri/Clad '55' Oil Field Motors are designed to meet the rigorous outdoor requirements of oil field installations. These new polyphase, drip-proof motors are equipped with a special neoprene rubber slinger to protect against foreign material entering and damaging bearings. A double-end ventilation system is used. Cooling air is drawn in at both ends of motor, circulated over bearings and around windings, then expelled through louvered openings at side of frame. The motor frame and end-shields are of rigid cast iron construction to help prevent corrosion and accidental damage to motor. For ease of installation, motors are equipped with lifting eye at top of frame. Former magnet wire and Mylar polyester film are utilized in motor's Class 'A' insulation system for added reliability. The motors are rated three-quarters through three horsepower at 1,200 rpm, and one through five horsepower at 1,800 rpm.

For more data on above item, circle E162 on postcard, Page 243

The Geolograph Company



Geolograph-Geoweight Recorder is offered in seven models with over 65 different charts to fit the particular need of each drilling operation. The newest of these Recorders, the G7PW and G7TW, keep an accurate record of penetration, trip time, formation breaks, downtime, drilling weight, string weight, weight on bit, torque or pump pressure. This information is recorded on a duplicate time strip chart with the highest possible degree of accuracy and sensitivity. Information is visible during recording and can be viewed to determine formation changes, need for bit change, round trip time, accurate drilling time, and other drilling information.

For more data on above item, circle E163 on postcard, Page 243

The Glidden Company

Glid-Crete, an epoxy floor topping, combines epoxy resins with a blended inert aggregate, to provide a highly chemical, impact and abrasion resistant coating. Glid-Crete may be mixed in standard mortar box or cement mixer and applied directly to old or new concrete, steel or wood by a mechanical trowel, hand trowel or special spray gun to thicknesses of from 1/16-inch up. 1/4-inch thickness is recommended for most applications. Glid-Crete is excellent for pump bases, loading docks or any floor area subjected to chemicals, abrasion or impact. Trained Glidden representatives are available to supervise application.

For more data on above item, circle E164 on postcard, Page 243

Type IV Nu-Pon Cote is a lining for tanks and equipment carrying crude petroleum. Type III Nu-Pon Cote lining performs satisfactorily in most applications, but Type IV Nu-Pon Cote was developed to combat the severe corrosion caused by hydrogen sulfide when crude is heated to 140° F for pumping in the winter. In some areas, outside temperature may be as low as —40° F and this creates severe thermal shock problems when crude is heated to necessary temperature. Type IV Nu-Pon Cote has gone through one winter under these conditions and has stood up exceptionally well. This was the only coating field tested under these conditions that attained a rating of 10. The hard coating has high gloss and excellent mar resistance. It may be cleaned easily and has excellent paraffin release. Trained Glidden representatives are available to supervise application.

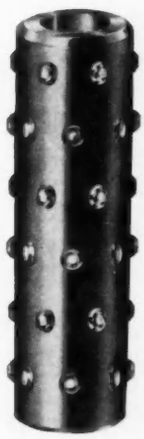
For more data on above item, circle E165 on postcard, Page 243

H. P. Gott Manufacturing Company

Galvanized Steel Hot or Cold Drink Container is lined with polyethylene and insulated with urethane foam, resulting in substantial savings in ice costs. Available in two, three, five, and 10-gallon sizes, the seamless replaceable liner won't leak, is easy to keep clean and sanitary, will not corrode. High performance insulation is supplied by urethane foam completely filling space between heavy-gage galvanized exterior and plastic liner, also improving structural strength. Recessed nylon faucets eliminate metal contact for contents and aid in insulation, since they do not permit heat transfer.

For more data on above item, circle E166 on postcard, Page 243

Grant Oil Tool Company



Grant Button Reamer Cutter and Grant All-Purpose Reamer Cutter are proving extraordinarily efficient in extremely hard formations such as are found in the Permian Basin of the United States. Both types of cutters are used in Grant Model 2020 Reamer, which features vertical placement of cutters in the body. Grant's Models 6480-A and 1530 Reamers with angled placement of conventional cutters, are recommended for reaming in other formations. Button Cutter utilizes tungsten carbide inserts, All-Purpose Cutter combines tungsten carbide inserts and specially hardfaced teeth in a conformation that proved superior in many tests of various patterns in Permian Basin drilling. Model 2020 Reamer has full-bore body in all sizes. This simplifies passage of fluid and instruments. By merely changing bushing blocks, one body can be used to ream several sizes with the same size cutters. Reamer pins are reversible for longer wear.

For more data on above item, circle E167 on postcard, Page 243

Grant Key Seat Wiper combines a reaming sleeve and an automatic clutch in a new tool to help prevent the formation of key seats or to detect and ream them out before drill collars become stuck. Wiper is placed between top drill collar and bottom drill pipe joint. Coming out of the hole, the ribbed sleeve (⅛-inch to ¼-inch larger than the collar OD) would wedge in a key set first. Ample free travel of sleeve on mandrel permits sleeve to be jarred out of the restriction. Sleeve is automatically re-engaged and becomes a reamer to wipe out the key seat and allow passage of drill collars. Tool consists of a one-piece, chrome nickel, heat-treated steel mandrel and welded-blade type reamer manufactured from tubing split longitudinally and welded around the mandrel. Blades are hardfaced.

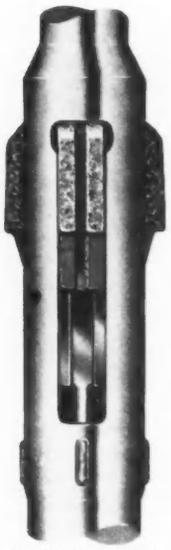
For more data on above item, circle E168 on postcard, Page 243

Grant V-Notching Tools, to prepare a wellbore for hydraulic fracturing, are available under license from Gulf Oil Company. Tools are adaptations of Grant hydraulic expansion Two-Blade Wall Scraper. The notching operation requires two steps: Tool, dressed with casing cutting blades, first cuts a 2¼-inch to 6-inch ring in the casing. Second, the same tool body, dressed with formation blades, notches the formation through this ring. The notch's configuration, being critical, is obtained automatically when blades are fully expanded. Total expansion is revealed by pressure drop through by-pass ports in the body. Gulf's experiments in over 40 wells revealed that, as hydraulic pressure is applied to the notched wellbore, a stress concentration is developed in the notch. Thus, fracturing is possible at a lower pressure than with perforations. Higher injection rates may be obtained through larger area of the notch.

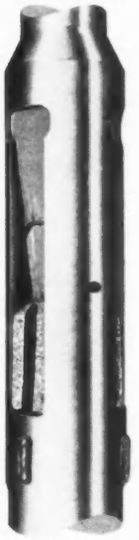
NOTCHING BLADE

CASING BLADE

For more data on above item, circle E169 on postcard, Page 243



BLADES OPEN



BLADES CLOSED

Grant Section Mill has an exceptionally rugged body. Its lower depreciation cost makes it the most economical section mill for foreign or domestic use. One set of blades, faced with fragmented tungsten carbide, customarily mills 30 feet of casing in one trip with cutting surface to spare. Section Mill has only four moving parts: three blades and a piston. In 15 to 20 minutes it can be completely inspected and redressed on the rig floor. Simplicity of the hydraulic mechanism permits extra strength at points of stress. No arms or extensions to bend or break. Complete retraction cannot be blocked or prevented. Section Mill normally operates under 6,000 to 10,000 pounds of weight. Its unique design permits application of maximum weight and eliminates danger of blades collapsing. Increased weight merely further insures maximum expansion. Experienced drillers quickly master its operation with instructions furnished by Grant technicians.

For more data on above item, circle E170 on postcard, Page 243

I. H. Grancell Company

Mr. 'B Metallic Lead Base Tool Joint Compound combines minutely divided and finely screened pure lead particles with a non-corrosive, hydrocarbon grease carrier extremely adhesive to all metals. This field tested mixture insures excellent performances in leak-proof make-ups and break-outs under any condition to prevent galling, seizing, tearing and washouts. Mr. 'B is permanently effective regardless of vibration, expansion, contraction, and drilling pressures. Its pure, high quality lead particles penetrate minute pores of metal threads and assures that all tool joint surfaces are mated perfectly. Because of low shear values of pure lead, 'Bestolife prevents build-up and provides a shoulder to shoulder contact guaranteeing complete joint efficiency and dependability.

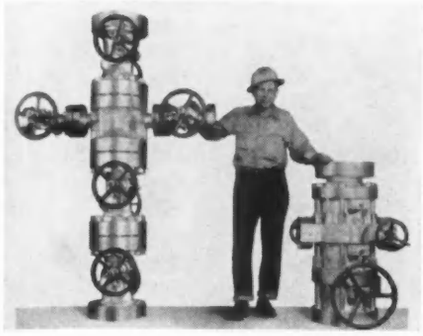
For more data on above item, circle E171 on postcard, Page 243

Graver Water Conditioning Company

Graver Automatic Tape Analyzer, a new concept in purity testing, automatically measures trace quantities of insoluble solids in liquids. It can be used to detect impurities in reflooding waters, waste water, process liquids, and boiler feedwater and condensate. Potentially it can be modified to sample air and gases and to detect solubles. The instrument is fully automatic, needs no operator attention, and its data may be stored for future reference. Able to detect quantities as small as 2-4 parts insoluble per billion parts liquid, it derives its versatility from the analyzing method it employs—the Millipore Filter® test. In addition to the basic information it provides, in the form of a circular stain on the filter tape, whose color indicates liquid purity, the Analyzer's data may be used for further testing and analysis.

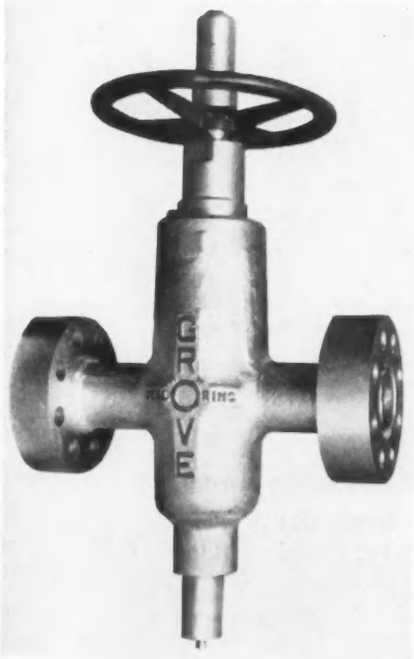
For more data on above item, circle E172 on postcard, Page 243

Grove Valve and Regulator Company



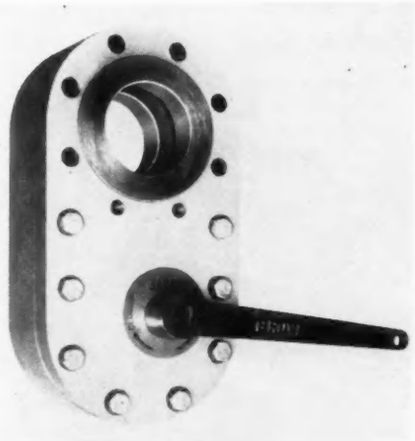
Valv-Pak Well Head Valve Assembly is less than half the size of conventional types. Besides its compactness, it permits rearrangement of valves as characteristics of the well change, and permits worn components to be changed in the field. Grove engineers estimate that the Valv-Pak can be assembled or disassembled in in the field in one hour or less. The Valv-Pak is offered in single, dual, triple, and quadruple completion christmas tree components.

For more data on above item, circle E173 on postcard, Page 243



Balance Stem Valve is used for christmas tree and general high pressure service. The balanced stem principal calls for a solid stem passing completely through the body, so that the gate may move freely up and down with no end surfaces for line pressure to push against. The balanced stem consists of two shafts placed opposite each other and leading in from the top and bottom of the body. They are linked together by the gate. The operating stem pulls against the balancing stem to balance the pressure load. The gate-stem unit moves freely up and down as if it were a solid bar, greatly easing operation of the valve. Threads on the rising stem work through a nut riding on two ball bearings, contributing still more to ease of operation. Bearings, nut and threads are on the outside of the body, safely away from line fluids. The valve also employs Grove's-"O"-Ring design which features a parallel faced gate that slides between floating seats. Instead of grease the seal is accomplished by polished metal seat rings with nitrile rubber "O" rings held against the gate.

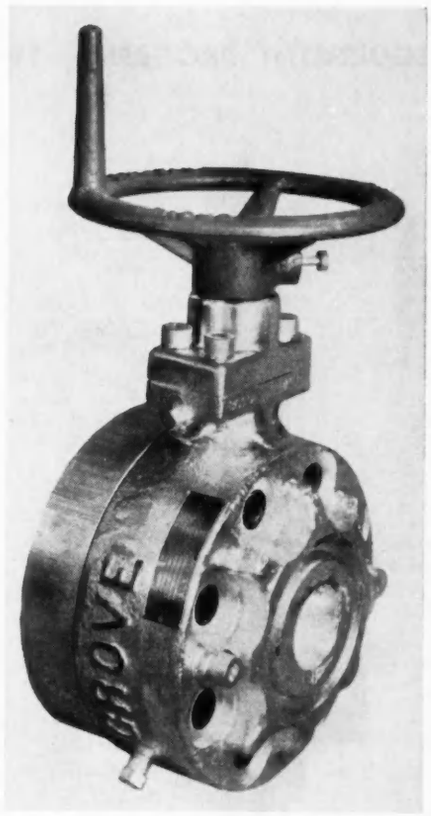
For more data on above item, circle E174 on postcard, Page 243



G-5 Valve, designed for general pipe line and manifolding service, is available in both lever operated and hand wheel operated models, in sizes ranging from two inches to 36 inches. The lever operated model is quick opening and the hand wheel model is equipped with double acme threads for fast action. The G-5 provides a seal on the upstream and downstream sides of the gate. For block and bleed service, the valve offers a reduction in hook-up costs by eliminating one valve and a spool previously required in such assemblies. Metal seat rings are in constant contact with chrome plated body side plates guaranteeing continuous scraping action through all gate positions. Also, Grove's patented application of nitrile rubber O-rings provides squeegee action to keep the side plates clean and cut down maintenance costs by eliminating the need for lubrication. When in the open position, the O-ring is completely removed from the flow, preventing damage from foreign matter in the flow line.

For more data on above item, circle E175 on postcard, Page 243

G-6 Regular Port Valve can be used in christmas tree assemblies or as a wing valve, casing head valve, or tubing head valve. It is ideally suited for use in flowlines, headers, or manifolds where large full opening valves are not essential. Equipped with a non-rising stem, the G-6 is substantially smaller in overall height and width, making it particularly suited for manifold service and other uses where compactness is an important consideration. The G-6 incorporates all the features of Grove's Seal-"O"-Ring design. Metal inner seat rings give a primary metal-to-metal seal backed up by O-rings. With each operation the metal seats strip foreign matter from the gate, seating surfaces are isolated from corrosive and erosive elements in the line. No lubrication is required.



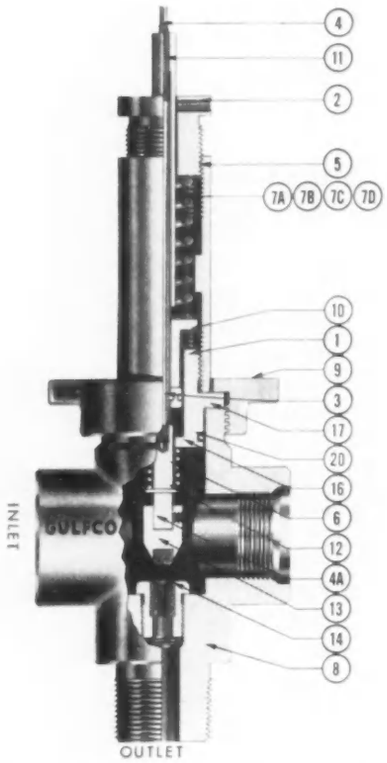
For more data on above item, circle E176 on postcard, Page 243

Gulf Coast Machine & Supply Company

Gulfco Type "AD" Full Open Adjustable Choke, a compact, rugged assembly, is the latest addition to Gulfco line of superior production chokes. This choke has proved itself ideal when necessary to flow the well wide open for a time to obtain sufficient production or permit the well to purge itself. Accurate flow control settings are easily set and read from large index dial calibrated from closed to 2-inch full open. It is a 3,000 psi working pressure choke.

For more data on above item, circle E177 on postcard, Page 243

Gulfco Type "HLC" Stop Cock shuts in at low pressure, opens at high pressure, is used in gas lift operations, gas transmissions, automatic tank batteries, or wherever stop cocking. Since Type "HLC" is self contained and pressure operated, it is not necessary to have a clock or reduced pressure. The female inlet and the male outlet are 2-inch, 11½ thd. The seat orifice sizes are from 8/64-inch thru 40/64-inch. The "HLC"



operates from line pressure. Applying tension on the spring will set the closing at any desired low pressure. To open at high pressure, adjust the adjusting stem. It is a 6,000 psi test pressure choke and is available through all supply stores.

For more data on above item, circle E178 on postcard, Page 243

Gustin-Bacon Manufacturing Company

Style "E" End Protection Gasket protects the bare ends of cement or plastic lined pipe at joints. The gasket is made for use only with Gustin-Bacon's standard Rigi-Grip coupling with "tongue-and-groove" interlocking mating faces. Its single piece solid design with compression sealing rib completely fills the void between bare pipe ends. Using the new Style "E" gasket with Rigi-Grip also puts an end to "crevice corrosion" common in welded and threaded pipe joints where fluid flow is interrupted. The Rigi-Grip with the new gasket will handle services to 2,000 psi, temperatures from —40° to 200° F. The gasket is available in sizes 2-inch, 2½-inch, 3-inch, 4-inch and 6-inch i.p.s. Installation is as easy as with a conventional grooved-end pipe coupling gasket. And, properly installed with G-B's Rigi-Grip coupling, provides a completely rigid, leakproof and corrosion proof installation. It performs equally well on either standard weight, cut-grooved or light wall roll-grooved pipe. Ends may be square out or beveled.

For more data on above item, circle E179 on postcard, Page 243

H. & M. Pipe Beveling Machine Co.

Aluminum Pipe Beveling Machine Storage Boxes reduce weight of boxes by approximately two-thirds, yet provide same strength and protection as old steel models with no painting and no danger of rusting. Boxes have special fittings to hold pipe beveling machine and torch in place and are designed to protect machines from effects of weather and handling damage when they are not in use. Boxes are provided with hasp for locking top to insure safe keeping and have a built-in carrying handle. They are manufactured in seven different sizes to hold every model of H & M pipe cutting and beveling machine, and are available for immediate delivery.

For more data on above item, circle E180 on postcard, Page 243

Bevel-Land Grinder, a patented electric or air motor driven grinding machine to smooth pipe cuts and place the land on bevels, replaces old, time-consuming method of using file and hammer, or hand-grinder, to clean and land bevels; assures uniformity and precision on all jobs. Grinder is available in two models for pipe ranging from 6 to 30 inches in diameter. Model 612 fits 6 to 12-inch pipe and Model 1430 fits 14 to 30-inch pipe. Machine is lightweight and

easily portable. It may be locked in place inside the pipe in seconds, and a simple adjustment in angle of grinding wheel will change machine from a cleaning to a landing position. Machine makes possible more positive alignment of pipe and better quality welds by providing cleaner bevels and more perfect lands.

For more data on above item, circle E181 on postcard, Page 243

Hagan Chemicals & Controls, Inc.

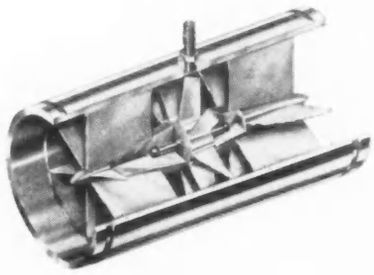
Controlled Solubility Phosphates prevent scale by inhibiting crystal growth in producing oil wells, heater treaters, salt water disposal systems and water floods. The sodium-calcium photophates, in true glassy form, have a guaranteed minimum P_2O_5 content of 68 percent, are non-hygroscopic, non-toxic and insoluble in oil. They are available in a variety of sizes ranging from a powder form to chunks approximately two inches in size. The phosphates dissolve continuously at a very slow rate making them self feeding and are labor saving since treatment is required only once a week.

For more data on above item, circle E182 on postcard, Page 243

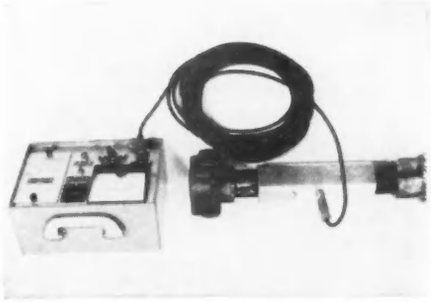
Halliburton Company

Densitroller is designed to automatically maintain a pre-set slurry density regardless of changes in pumping rates and/or pressures. The pre-set density cannot only be maintained, but can also be changed by the operator at any point in the job by merely resetting the density selector above the unit's strip chart. In operation, Densitroller receives a density signal from the Halliburton Densometer and pneumatically regulates a valve in the fluid by-pass line. Water flow through this valve raises or lowers the overall slurry density on command from the Densitroller. Maintaining a density variance of $\pm$ 0.1 pound per gallon, the Densitroller is leading the way to better, more uniform cementing jobs by helping eliminate troublesome weak spots in the cement column.

For more data on above item, circle E183 on postcard, Page 243



Flowmeter

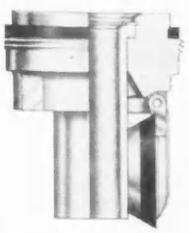


Analyzer

Flowmeter and Flow Analyzer represent a new instrument team designed to continuously indicate flow rate and give an instantaneous reading of total flow at any point during the cementing job. Flowmeter is installed in the line and as passing fluid turns the rotor, an electrical impulse is sent to Flow Analyzer. The transistorized Analyzer, an amazing example of electronic miniaturization, converts the impulses into dial reading of flow rate and digital reading of total flow. With this instrument team positions of the cementing plugs can be more easily determined during a cementing operation, and the cement position can be more accurately checked during plug back or squeeze operations. It is also valuable in helping to maintain equal displacement during multiple string completions.

For more data on above item, circle E184 on postcard, Page 243

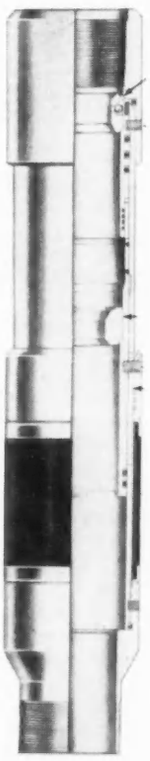
Insert Float Valve and Insert Self Fill-Up Float Valve Casing Floating Tools are inexpensive and efficient. They are designed for use in wells where a medium range of differential pressure exists. The basic valve consists of a readily-drillable cast aluminum body, flapper valve and spring and two rubber sealing rings. Since each valve is installed by a short thread inside the casing coupling, no length is added to the string, and two threaded connections are eliminated for each valve used. In operation, the Float Valve is held closed by its spring during floating in and after cementing is completed. The Self Fill-Up model is equipped with a plastic orifice tube which holds the valve open during run-in. When casing is a few joints off bottom, a weighted plastic ball is dropped to shear tube and close the valve to hold against pressure from below.



For more data on above item, circle E185 on postcard, Page 243

EZ Lok Limit Clamp provides an inexpensive, fast and effective method of installing auxiliary tools on casing, is available for most casing and tubing sizes. This device, built to eliminate time consuming welding of limiting devices to casing, has been successfully tested with loading of 20,000 pounds in all directions.

For more data on above item, circle E186 on postcard, Page 243



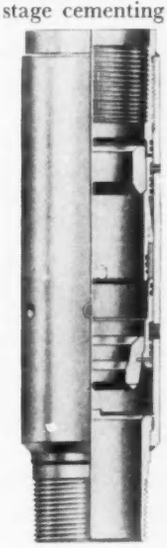
"DV" Packer Cementing Collar is the latest advancement in staged primary cementing. The tool has all the advantages of the popular "DV" Multiple Stage Cementer plus a built-in rubber sleeve-type packer that expands to seal off the annulus, replacing the need for several cement baskets below the tool. Among the many applications of this outstanding new tool are: cementing above a lost circulation zone; dual zone completions; full hole cementing of slotted or perforated liners; cementing of formations at any desired point.

For more data on above item, circle E187 on postcard, Page 243

Halliburton HR-12 has opened the way to practical placement of cement in the deepest wells drilled. Already used successfully below 19,500 feet, HR-12 can be used to retard cementing compositions up to approximately 500° F. static temperature and provide excellent early strengths. Two key features of HR-12 are its economy and its compatibility with all A.P.I. Class D and E cements as well as Pozmix cements and Pozmix 140.

For more data on above item, circle E188 on postcard, Page 243

"DV" Multiple Stage Cementer, the tool that made multiple stage cementing practical, now is available in a scaled-down version for use in tubingless completions. The "DV" tool incorporates a novel hydraulic principle. Two sleeves are housed within the body of the tool. The lower or opening sleeve seals cementing ports during circulation and allows passage of cement for lower stage of the job. The upper or closing sleeve seals off tool ports after completion of the upper stage. Bomb Type Opening and Closing Plugs are used to operate tool sleeves.

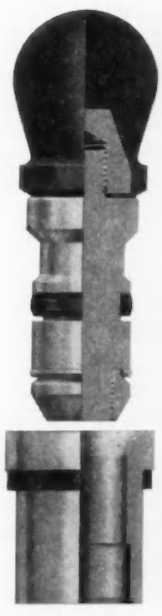


For more data on above item, circle E189 on postcard, Page 243

Thermic Acid Process employs 20-40 mesh magnesium pellets and HCl acid. When acid reacts with pellets, a large quantity of heat is liberated in a very short time. This heat, 8400 btu lb. of reacted magnesium, can be used to facilitate dissolution of iron compounds, paraffin and certain dolomitic formations.

For more data on above item, circle E190 on postcard, Page 243

Omega Latch-Down Tubing Plug is designed for better wiping action at higher displacement rates in tubingless completion work. When the plug is inserted in tubing, its radial interference provides a preloaded seal which gives better wiping ability. In the tubing, spherical shape on top of Omega Plug is deformed into a cylindrical shape. This deformation provides a reservoir of rubber to compensate for wear as plug is pumped down tubing. A small guide lip is provided on lower end of plug to cut down wobbling of plug as it is pumped through joints. A metal insert is molded in the lower end of plug to provide a seat when landing on float collar. The Latch-Down Tubing Plug is an Omega plug with added feature of a more positive latching and sealing nose that seats on a baffle in tubing string.



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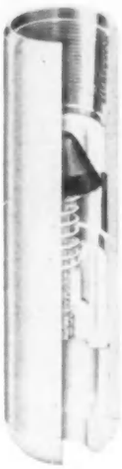


Tubing Floating Equipment has been designed into amazingly compact sizes for work in tubingless completions. Super Seal Float Shoes and Float Collars with or without self-fill attachments—cast aluminum Nose Guide Shoes—and many other tools have been developed for tubingless completion requirements. The fine craftsmanship and advance design reflected in each of these small tools is the same as that built into their larger counterparts by Halliburton.

For more data on above item, circle E192 on postcard, Page 243

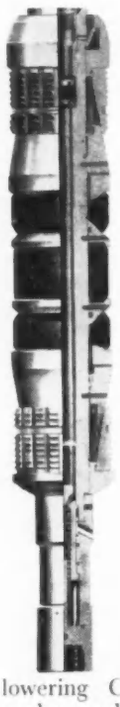
SDC Squeeze Packer for 2⅞-inch OD 6.50# tubing more effectively seals off annulus for squeezing cement below packer at any predetermined point behind the tubing (casing) or around shoe or shoe joint. The tool may also be quickly and easily converted into a bridge plug to help prevent fluid movement from either direction. SDC is made of high-strength drillable materials and is designed for general application in any well, regardless of depth, involving pressures up to 10,000 psi. Sealing element is supported on each end by expanding metal shoes which form metal bridge between mandrel of tool and casing ID and help prevent rubber extrusion under pressure. The tool contains a cone-type back pressure valve which is held open during run-in by a releasing mechanism incorporating a ball-and-seat float valve. After packer is set, applied hydraulic pressure releases ball and seat, and allows back pressure valve to seal.

For more data on above item, circle E193 on postcard, Page 243

2⅞-inch WLC Bridge Plug is designed primarily as a wire-line-set tool. It is constructed with the same slips, rubber sealing elements and expanding shoes as the SDC Packer, but its shorter overall length means less material to drill out after completing a job. The WLC tool may be set with the Cup Type Setting Tool on a sand or drilling line or if the tool is run on tubing, it may be set with a modified mechanical circulating valve. The tool is designed to hold 10,000 psi differential pressures.

For more data on above item, circle E194 on postcard, Page 243

"SV-DC" Squeeze Packer maintains design features of other Halliburton squeeze packers, plus an important additional feature: a unique spring loaded pressure balanced valve built to help hold pressure from either direction when closed. Other design features include: (1). Prevent loss of mud to formation due to low break-down pressure. (2). Hold annulus fluid load away from weak formation below packer when Circulating Valve is removed. (3). Eliminate dropping or pumping down a sealing plug or ball for shut-off. (4). Pressure below packer can be released if desired. (5). Tubing can be tested without aid of another device. After the packer is set, either by tubing manipulation or with wire line tools, a pick-up on setting string and Circulating Valve will move sliding valve up to closed position. Valve can be reopened by lowering Circulating Valve back into packer and pushing downward. Packer is available in most of the popular casing sizes.



For more data on above item, circle E195 on postcard, Page 243

Super-Duty Power-Driven Measuring Assembly is equipped with 18 horsepower diesel engine coupled to the Super Duty Reel Assembly through a three-speed transmission. The entire unit is packaged on a structural skid and is guarded by pipe railing for protection in hoisting and handling. Overall design and construction of this unit make it ideal for use with deepest offshore or land operated rigs. In operation, the running-in speed of the drum is hydraulically controlled by a pump and valve arrangement supplemented by a dependable spot-type brake.

Line Capacities

.092" — 32,600'	3/16" — 8,300'
⅛" — 17,700'	¼" — 4,700'
9/64" — 14,830'	5/16" — 3,000'
5/32" — 12,000'	

For more data on above item, circle E196 on postcard, Page 243

Fracometer provides continuous visual and strip chart readings of flow rate, wellhead pressure, fluid density and hydraulic horsepower during fracturing operations. Running total of gallonage is read visually. With this information, you can follow closely the progress of the treatment and determine immediately any needed modifications. The permanent record becomes a valuable reference. This instrument has proved its merit in oil and gas producing areas throughout the world.

For more data on above item, circle E197 on postcard, Page 243

Fracplan incorporates several new concepts in fracture treatment design, is based on laboratory testing under simulated well conditions of fluid samples and cores from the section of formation to be fractured. From results of this evaluation, the most compatible and efficient fluid tested is selected, the most competent propping agent determined, and volume of fluid or fracture area calculated. The quantity and type of propping agent selected is that which tests indicate will give the highest flow capacity fracture. With this information, you can make a more confident decision on each detail of the fracturing job you want performed.

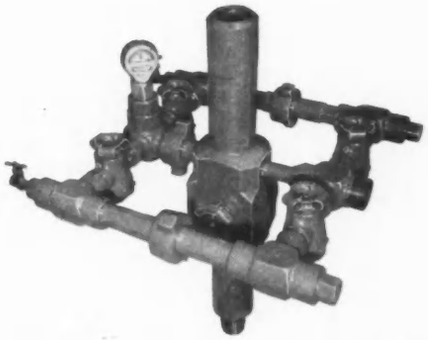
For more data on above item, circle E198 on postcard, Page 243

Hydra-Jet Tools are available in a wide range of sizes designed for horizontal or vertical notching for fracture initiation. Hydra-Jet can be used to wash down a producing interval to help remove damaging "skin effect" and plugging filter cake. This action assists in obtaining improved results from subsequent acidizing jobs. Deep, clean perforations can be cut into producing intervals with Hydra-Jet without damaging effects. Remarkable savings can usually be realized in cutting off casing before abandonment in offshore as well as land operations because (1). The operation can be performed by the same crew using equipment on the rig following plug back cementing job; (2). With the tool in place, cutting time is measured in minutes; and (3). The pipe is severed cleanly. When required, cuts may be made below the ocean floor.

For more data on above item, circle E199 on postcard, Page 243

WAC-8 Water/Acid Control Additive represents a new approach to reducing fluid loss problems in fracturing with water or acid. WAC-8 minimizes wasteful fluid loss during fracture extension. After breakdown of the formation, it is designed to temporarily plug tiny flow channels in the matrix face of fractured formation. With these openings closed off, more fluid is retained in the fracture, helping to extend fracture farther into producing zone. The cost of using is low because only a small amount is required. An extra benefit is the friction lowering effect provided by this additive which can reduce surface horsepower requirements.

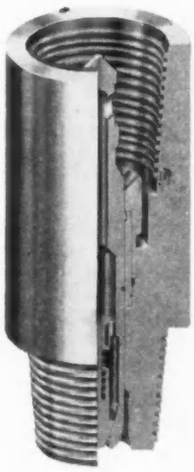
For more data on above item, circle E200 on postcard, Page 243



LT-20 Control Head and Manifold are designed to help control high pressures in excess of 10,000 psi at the surface during testing of potential oil or gas wells. Special inserts with O-ring seals aid in protecting all threaded connections by holding the pressure rather than relying on threads themselves to perform this function. All valves are Halliburton Lo-Torq Plug Valves, recognized for their quick opening action and positive sealing action against high pressure oil and gas. The body of the control head and adapters for drill pipe connection have sufficient strength to pick up drill pipe weight far in excess of any used today without causing undue strain or binding on master valve parts. The assembly is installed at the surface on top of drill pipe at a convenient working height for valve operation.

For more data on above item, circle E201 on postcard, Page 243

Retrievable Back Pressure Valve provides the safety of a water cushion during a formation test, and still helps detect a low pressure zone that might be hidden by the water cushion pressure. The valve is a back pressure type which supports the water cushion and provides an air space between cushion and testing tool. The air space provides a means to recover a fluid sample and a record of formation pressure even if formation pressure is less than that of cushion. If formation pressure is higher of the two, valve will open and allow formation to produce into water cushion. Tool is designed so the valve section can be retrieved from its running case with aid of a wire line.



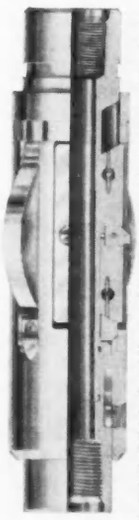
For more data on above item, circle E202 on postcard, Page 243

Tubing Tension Anchor, for wells where there is little danger of tubing separation, is becoming popular with operators who have found tension set tubing to be helpful in reducing wear on rod and tubing couplings. By helping to prevent "breathing" and buckling of tubing by setting it in tension, thread life throughout the string can be increased, pumping unit life and pump efficiency can be increased, and chance of rod or tubing breakage can be lessened.

For more data on above item, circle E203 on postcard, Page 243

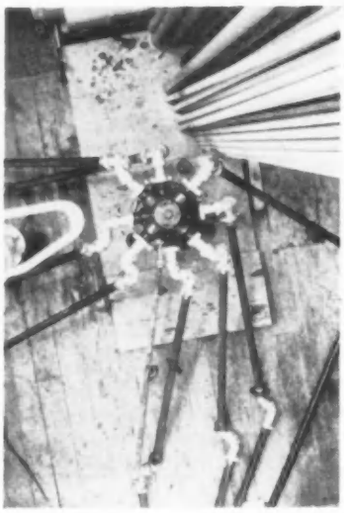
Sancon makes it possible for wells plagued by unconsolidated formation sand to be turned into profitable producers. New technique employs a non-resin, inorganic chemical as the basis for treatment. After well is cleaned and a volume of clean oil and Halliburton Hyflo pumped into the formation, the Sancon solution is injected at a rate of about 20 gallons per foot of formation to be treated. Following phases involve (1). A second diesel oil Halliburton Hyflo mixture to re-establish formation permeability, but leave each sand grain enveloped by a film of Sancon. (2). A settling solution injected which flash sets Sancon consolidating solution. (3). A final stabilizing solution injected to further strengthen and stabilize the set to well fluids.

For more data on above item, circle E204 on postcard, Page 243



Retractable Collar Locator provides a simple, dependable means of locating collars for purposes such as proper placement of Halliburton's Hydra-Jet tool for perforating or cutting casing and location of proper packer seating points. In operation, tool is run in with its locating pins locked in retracted position. Tool is actuated by lifting and turning tubing to release locator pins. Tool can then be lowered until pins seat in a collar and indicate its location by a loss of weight on weight indicator. Up to 25,000 pounds weight may be set on the pins. Lifting the tubing retracts and locks indicating pins to allow tool to be retrieved or moved to locate another collar.

For more data on above item, circle E205 on postcard, Page 243



Fracturing Heads are aids for complete pressure testing of the entire manifolding system up to the casing connection at the well head. Either of the two new types of Fracturing Heads is designed for single or stacked installation and is equipped with a quick change cap with adequate clearance for running tools through the head. The steel casting model is tested to 10,000 psi. The fabricated steel head is tested to 7,500 psi. Heads are provided with either 2-inch or 3-inch connections to the pump lines. Each connection may be equipped with the new Halliburton integral check valves to help prevent reverse flow. Special openings may be provided if desired for injection of Perfpac balls.

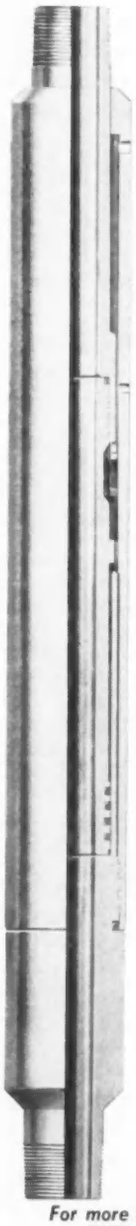
For more data on above item, circle E206 on postcard, Page 243

Friction Reducers have advanced the science of programming fracturing treatments. Horsepower-wasting friction loss encountered as fracturing fluids are pumped down the well may be significantly reduced in many cases by utilizing Halliburton developed chemicals. In some fracturing treatments, small quantities of inexpensive additives have reduced the friction resistance or pressure (ΔP_f) as much as 30-50 percent.

For more data on above item, circle E207 on postcard, Page 243

Lo-Torq Plug Valves with threaded connections are available in several new sizes with flanged ends. The quick opening valve requires minimum effort to operate and offers full opening, dependable pressure containment for the most severe service. Designed for low initial cost and long service life, valve can be completely overhauled in the line when necessary. No need for returning to factory for repair. These valves are of finest quality. Extra steps in their manufacture—like machining both faces of each API ring joint flange—help provide efficient, dependable performance. Flanged end full opening sizes available include 2-inch and 3-inch models with 3,000 and 5,000 psi working pressures with standard API flanges.

For more data on above item, circle E208 on postcard, Page 243



Full Opening Jars utilize the hydrostatic pressure of a fluid-filled well in delivering a jar to a stuck packer. Jar is in cocked position when pipe weight is slacked off, as when packer is set. In this position, the pressure is equalized on both sides of sealing packer. When pull is applied to pipe against a resistance, the string is stretched until sealing packer moves past ports in the case of the jars. At this point, the vacuum created within the tool is equalized and the stretched pipe imparts its energy to jars resulting in a powerful blow being delivered to stuck packer. Slacking off on pipe weight cocks tool for another blow if necessary. The full opening of tool permits passage through it of any equipment that can be run through 2⅜-inch OD tubing.

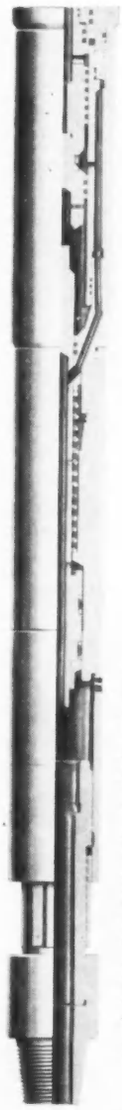
For more data on above item, circle E209 on postcard, Page 243

WG-4 Instant Water Gelling Agent allows continuous preparation and injection of gelled water as the carrying medium in a water-frac job. Features include: (1). No material is wasted due to surplus batching. (2). Pre-gelling and related pumping problems are eliminated. (3). No batching tank or batching time is required. (4). Ratios of WG-4 and sand to the fluid may be individually controlled.

For more data on above item, circle E210 on postcard, Page 243

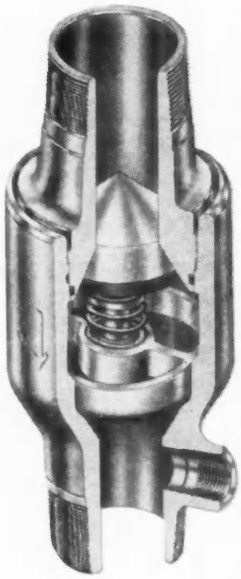
2⅞-inch Retrievable Tension Packer is designed to be run inside 2⅞-inch OD tubing to isolate a section for fracturing, acidizing, squeeze cementing, and other pressure treatments. Packer is set in tension by turning tubing to the right and applying an upward pull. This action closes the Circulating Valve, sets mechanical slips, and expands Packer rubber to provide a seal. Packer is released by lowering tubing to re-engage automatic J-slot. A dual safety device provides for (1) release of slips by upward pull on tubing after right hand rotation, or (2) further rotation will release the Circulating Valve from packer.

For more data on above item, circle E211 on postcard, Page 243



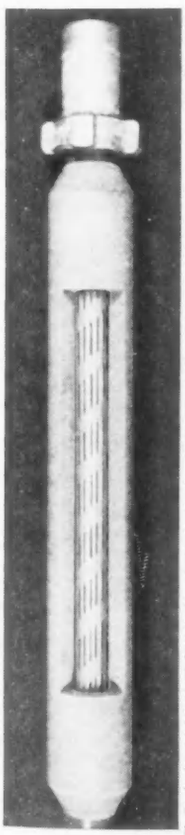
Locked-Open By-Pass, used in conjunction with Halliburton's Hydro-Spring Tester provides an open by-pass while going in the hole and permits closing in the formation as many times as desired simply by up and down movement of the drill pipe. The By-Pass is pressure balanced until it closes, at which time hydrostatic pressure acting on seal holds it closed. This permits the Hydro-Spring Tester to be closed as many times as desired without opening By-Pass or unseating packer.

For more data on above item, circle E212 on postcard, Page 243



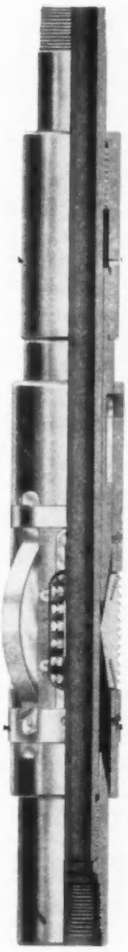
Check Valve is designed to help furnish positive instantaneous line shut-off if fluid flow should stop. The valve, seat and body are precision constructed of heat treated alloy steel. A rubber insert molded onto check valve helps provide a positive seal against the valve seat. Valve may be positioned in flow stream in any position since it is activated by oil-tempered coil spring which requires no back flow to aid its operation. Available valve sizes are 2⅜-inch OD line pipe (1½ double female pipe thread), and 5½ and 7-inch OD, API casing (8 rd. double male thread). Working pressures are 10,000 psi (2⅜-inch) and 5,000 psi (5½-inch and 7-inch).

For more data on above item, circle E213 on postcard, Page 243



Halliburton sand Screen is a new and different approach to downhole protection against unconsolidated formation sands. It is a slotted liner with a bonded outer layer of consolidated sand. This layer of sand acts as natural buffer against produced formation sand. It is inert and compatible with most formations. The greater flow area provided by the sand facing tends to diffuse suspended formation sand, rather than have it concentrate and restrict entry points. Bonding agent is a thermo-setting resin, giving extremely high compressive, shear and tensile strengths to the sand jacket—while retaining permeability of more than 40 darcies. Sand Screens are 6 feet in length and are available for running in 4½, 5½, and 7-inch OD casing, or in open hole.

For more data on above item, circle E214 on postcard, Page 243



Tubing Anchor - Catcher is designed to anchor tubing in tension to reduce wear on sucker rods and tubing by helping to prevent "breathing" or buckling of tubing string as subsurface pump raises fluid in the tubing. If for any reason tubing should part above the tool, as may occur in wells where corrosion or embrittlement is a problem, the catcher feature causes slips to reverse and re-engage casing wall by action of the tubing starting to slide downward. This action helps prevent tubing from falling to bottom—and the resulting fish is normally a straight, easily retrieved section rather than a twisted, jagged stack of steel. Tool is set by tubing manipulation and upward pull. Positive holding action of slips permits additional pull to place tubing in tension.

For more data on above item, circle E215 on postcard, Page 243

SCP-3 High Temperature Scalechek Material was developed to treat wells with bottom hole temperatures exceeding 180° F. SCP-3 is a slowly soluble glassy phosphate which acts within the formation to minimize scaling for extended periods of time. SCP-3 can be injected alone or in conjunction with a fracturing treatment.

For more data on above item, circle E216 on postcard, Page 243

Oilsperse is a non-acid, oil-base mud removal solution designed for use with water base muds, oil-in-water emulsion muds, and soap-oil emulsion muds. Its excellent thinning and dispersing properties make it efficient in loosening stuck drill pipe and improving bonding in primary cementing.

For more data on above item, circle E217 on postcard, Page 243

Acid Inhibitor No. 34 has been undergoing research and development for 3 years. It is a new organic inhibitor for HCl acid. It is designed to remain stable for longer periods of time at increased temperatures, thus imparting better protection to tubular goods in the deeper, hotter wells.

For more data on above item, circle E218 on postcard, Page 243

Stick Howco Suds is a foaming agent for both fresh and salt water. This foamer is designed primarily for water removal in drowned gas wells. The cylinder is 1¼-inches in diameter and 18-inches long. When the stick is dropped into the well, it remains intact until contacted by water condensate. It then begins to dissolve, and when agitated by the gas it foams large quantities of water out of the hole in a relatively short time.

For more data on above item, circle E219 on postcard, Page 243

Tubing Spacer is designed for use in centralizing single or multiple tubing strings. It is made of hard rubber with positive type ribs. A minimum stand off of ⅝-inch provides less fluid restriction. Ends of the Tubing Spacer are tapered to help prevent coupling interference when running tubing. The Spacer is split for fast installation with metal banding.

For more data on above item, circle E220 on postcard, Page 243

Mud-Flush is a non-corrosive, aqueous solution of several additives designed to help remove drilling mud which has been contaminated with salt water. This non-acid mixture effectively lowers the viscosity of mud systems and aids in maintaining solids in a dispersed state; also effective when staged ahead of primary cementing.

For more data on above item, circle E221 on postcard, Page 243

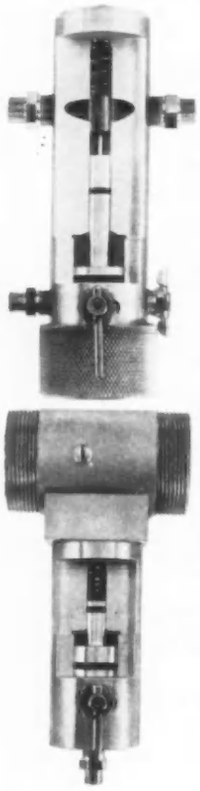
Harbison-Fischer Manufacturing Company

"Little Squirt" Sub-Surface Pumps are designed for slim-hole wells with 1¼-inch or 1½-inch tubing. Designed to provide all the operating advantages of small-diameter tubing, with the stamina and dependability of regular-sized pumps, these slim-hole pumps are available in four rod pump sizes and five tubing pump sizes, with metal or cup plungers. A complete line of slim-hole pump parts and accessories is also available, including seating nipples for rod pumps, regular 10-round or 11½ V-type tubing couplings and lock nuts, chrome-plated plungers, heat-treated barrel tubes, etc.

For more data on above item, circle E222 on postcard, Page 243

The Happy Company

Schafer Oil Sentinel is designed to cut off engines when oil pressure drops, and is available in model for use with both gas and liquid fuels. Engine pressure moves internal piston of the Sentinel upwards; a total movement of 3/8 of an inch is involved. The piston, forced up against a factory preset pressure spring at the top of the cylinder, allows fuel to flow past rod supplying fuel to the running engine. When oil pressure falls below downward force being exerted by pressure spring, piston is pushed downward, cutting off fuel supply to engine. The engine stops. In the gas model, piston opens and closes a butterfly in the fuel line. Pressure springs are available for engine operating pressures from 5 to 30 pounds. Installation is simple; merely tap into fuel line and into pressure side of oil line or block, and install fittings.



For more data on above item, circle E223 on postcard, Page 243

Harley Sales Company

Harley 7400 pump is the low price answer for salt H_2O disposal and transfer. Features: Ductile (nodular) iron fluid end with 30,000 psi and 15 percent elongation. Stainless steel, chrome coated piston rod. Packing spring loaded in deep stuffing boxes; adjustable packing nuts. Steel piston cylinder covered with smooth, noncorroding porcelain—easily removed for replacement or inspection. High safety factor steel air chamber treated with special epoxy coating for maximum corrosion resistance. Stainless steel, spring-actuated valves. Both pinion gear and pinion machined from one-piece, hardened high-grade steel. Double gears insure perfect alignment, even load distribution. Crankshaft gears are double and made of ductile iron. Pump is single cylinder, double acting, reciprocating type.

For more data on above item, circle E224 on postcard, Page 243

Herb J. Hawthorne, Inc.

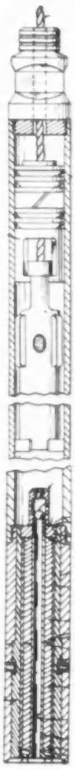
"Blue Demon" 4-Blade Insert Bit, for seismic shot hole drilling, has new cuttings deflector designed to deflect drilled cuttings away from center of bit, and into return circulation stream. Deflectors are forged into face of blade. Equally effective with either water or air as the circulation medium, deflectors tend to prevent plugging, which makes bit particularly efficient in drilling through alternating layers of hard and soft formation. They give the driller considerable versatility with drilling weights, which in turn results in faster drilling. The bit's replaceable insert blades are designed to be completely worn out and discarded, and replaced with a new set in same bit body, providing factory-controlled, on-the-drill bit service. Developed for faster penetration in harder formations, with more cutting surface on bottom to provide straighter hole without loss of gage, bits are available in all popular shot hole sizes.

For more data on above item, circle E225 on postcard, Page 243

"Blue Demon" Unitized Insert Bit reduces bit plugging between formation layers in shot hole drilling. Equally effective in either water or air drilling, bit has deflectors designed into blade face, which deflect drilled cuttings away from center of bit and into return circulation stream. Forged into the blades, deflectors make bit particularly effective in drilling alternating hard and soft formations, giving considerable versatility with drilling weights, which in turn results in faster hole. Bit is designed to be completely worn out and discarded, and is available in 4¼, 4½, and 4¾-inch sizes, with 2⅜-inch API pin. Shipped in handy size-packs, for easy handling in storage and in the field.

For more data on above item, circle E226 on postcard, Page 243

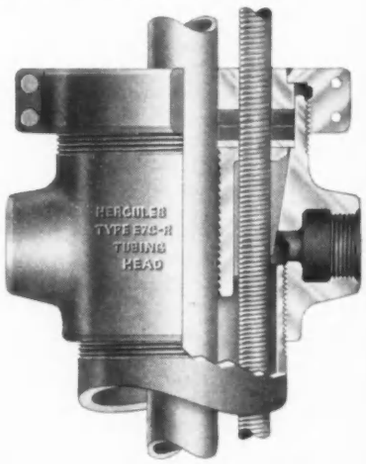
Hendershot Tool Company



Midco Sand Pump has a sleeve-like permanent magnet connected to the bottom for removal of debris, sand, fluid, and metallic particles from a well bore in one operation. This device permits an unobstructed circulation of fluid through the electric magnet to fill the load chamber, obviating the use of fishing tools for that purpose. This device also provides a magnetic means for closing the fluid passage through the magnet for trapping debris, metallic particles, etc., within the load chamber, facilitated to empty its contents at the earth surface. The cylindrical-like permanent magnet has a long life and may be easily and quickly replaced.

For more data on above item, circle E227 on postcard, Page 243

Hercules Tool Company



Type "E7C-R" Tubing Head is an efficient and economical tubing head for suspending Reda and BJ submersible electric pumps in 7-inch OD casing. Ideal for water supply wells, salt water disposal wells or wells having extremely high water-to-oil ratios. Will safely suspend a maximum of 5,000 feet of 2, 2½, or 3-inch (plain or EUE) tubing with electric pump and cable at 500 psi, or less, operating pressure. The pressure

cast steel bodies are each hydrostatically tested to 2,000 psi and the packing arrangement tested to 1,000 psi. Slips are hinged for easy installation or removal and are self-aligning. The head, tubing, and cable are packed off stimultaneously by turning the cap clockwise, compressing the neoprene packing rings between the metal top and bottom rings that are placed above the slips. The cap, split in halves and held together by four bolts, is provided to permit installation after tubing and cable have been run. Overall height is approximately 9 inches. Minimum bore in body is 6⅜ inches.

For more data on above item, circle E228 on postcard, Page 243

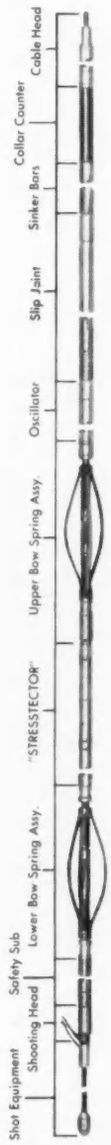
Hiller Aircraft Corporation

Hiller E 4 Four-Place Helicopter is powered by a 320 horsepower Lycoming engine, a more powerful version of the same engine that lifted a 12 E copter to a world record rescue at 18,000 feet on Mt. McKinley, Alaska earlier this summer. With more usable power, the E 4 can climb vertically when fully loaded. The E 4's verified climb rate is 820 feet per minute. This margin of power increases the versatility of the E 4 in two ways: First, it can do the heavy duty hauling and lifting the 12 E's noted for. Second, this extra power is a big margin of safety for executive and other high priority passenger transport.

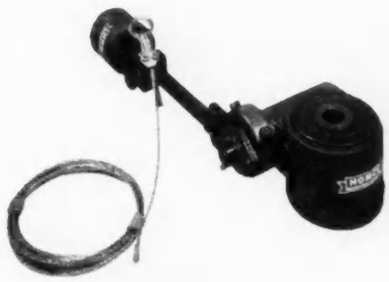
For more data on above item, circle E229 on postcard, Page 243

Houston Oil Field Material Company

HOMCO Stresstector Free Point Indicator accurately detects the free point deep in a long string of heavy drill collars and enables the operator to back off and recover the maximum number of collars. The new Indicator is the smallest instrument of its type available (1⅜-inch OD). It can readily be run through drill pipe or tubing restrictions as small as 1½ inch in diameter. It is a full functioning unit designed to indicate accurately all forms of stress or strain transmitted down the string. HOMCO has designed and perfected a new coil and sensing element and a high temperature oscillator which results in a subsurface indicator that has much greater sensitivity and resolving power than is available in other instruments. With this instrument the operator may use right-hand or left-hand torque, tension, or compression to determine the free point.



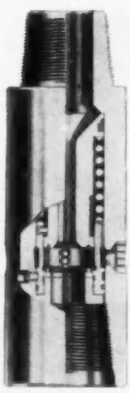
For more data on above item, circle E231 on postcard, Page 243



HOMCO Ace-O-Matic Rod Revolver is designed for mounting on the carrier bar of pumping units to rotate the sucker rod. Using the Rod Revolver reduces rod and rod collar wear and helps prevent paraffin buildup in tubing. A cable connects operating lever to walking beam to provide driving power. Rotating speed can be adjusted by adjusting drive cable connection. The Rod Revolver, using adapter bushings, works with 1⅛, 1¼, and 1½-inch polish rods. The 5-inch diameter of the revolver body permits it to fit between the bridle cables on most carrier bars. Load capacity of the Rod Revolver is adequate for wells deeper than 10,000 feet.

For more data on above item, circle E232 on postcard, Page 243

HOMCO Jet Bypass Valves are used with jet type drill bits to provide auxiliary openings in the drilling assembly above the bit. The valve permits normal fill of pipe while running in the hole, thereby reducing possibility of damage to lost-circulation zones because of pressure surges. Valve remains in closed position when circulating and directs all the drilling fluid through the bit. When drilling assembly is retrieved, valve is in open position permitting pipe to drain. Thus, swabbing effect of the bit is reduced as it is retracted and necessity of pulling wet strings of pipe is eliminated.



For more data on above item, circle E233 on postcard, Page 243

Giant Oil Field Float for Desert Operations hauls net payloads of 100,000 pounds and more, has 21-inch deep centerbeam fabricated of high-strength steel. Loads can be tailboarded over rolling tailpipe, or winched up from the front when the trailer's nose is let down to the ground. Specially-engineered tandem suspension system prevents weight transfer and places equal load on all 21.00 x 25 tires. Suspension system is completely rubber-bushed eliminating lubrication, and wear and abrasion that occurs when sand or mud mixes with lubricants in conventional bushings. Available in lengths to 36 feet, widths of 10 feet.

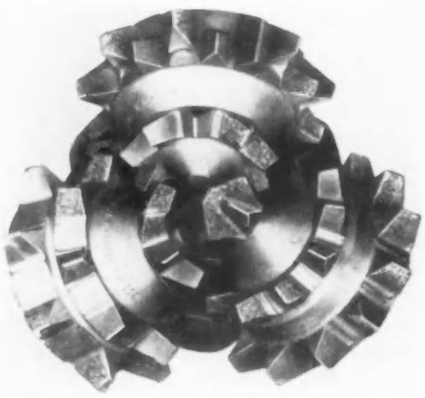
Hobbs Trailers

For more data on above item, circle E230 on postcard, Page 243

HOMCO Ace-O-Matic Tubing Revolver is designed to reduce tubing wear and to help prevent paraffin buildup in the tubing. It is in a rotating tubing hanger that is mounted on the well head, and has all necessary pressure control features of a tubing hanger. It may be installed before tubing is in place or when tubing is pulled for a well workover. The Tubing Revolver can handle tubing loads in pumping wells deeper than 10,000 feet. The worm drive shaft is mounted in easily removed, heavy duty antifriction bearings. A hydraulic fitting is provided to permit bearing lubrication. It is easily disassembled for inspection and maintenance. Can be mounted on standard 6-inch well head flanges. It can also be provided with a length of threaded casing so it can be mounted on the production casing.

For more data on above item, circle E234 on postcard, Page 243

Hughes Tool Company



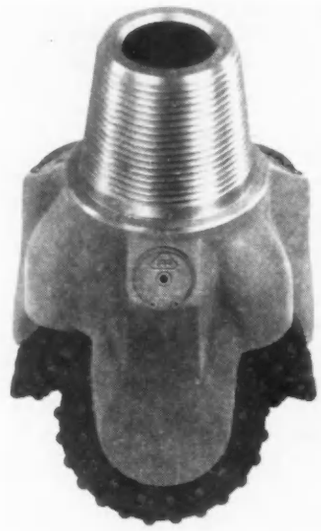
Hughes OSC-1G has been redesigned to increase rate of penetration. Tooth height has been increased, giving a deeper cut and more gouging-scraping action. Offset of cones has been increased, giving more twisting-tearing action as bit is rotated. Greater ventilation of heel teeth reduces balling, leaving the bit free to take a "bite" of maximum depth with each contact on bottom. Deep intermesh also contributes to keeping the teeth cleaner. Fewer rows of teeth having less contact on bottom serve to increase rate of penetration. Length of tooth crest on the inner rows has been increased, adding to toothstrength in this critical area. Initial field tests show that OSC-1G gives more bit life. Available in sizes from 6-inch through 12¼-inch.

For more data on above item, circle E235 on postcard, Page 243

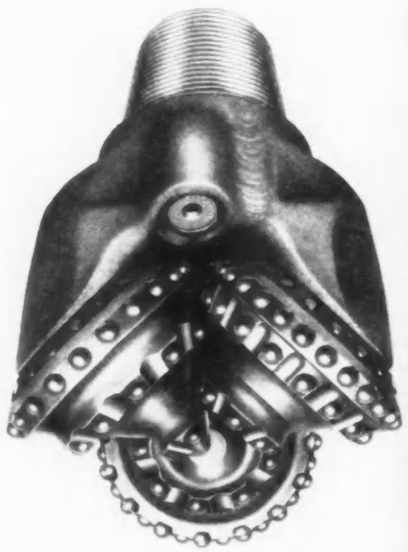
Hughes RG-7XJ is designed to drill the weaker or softer segment of hard formations. Cutting structure is identical with RG-7J. The difference is the bearing seal that seals in lubricant and seals out drilling fluid. This is an exclusive Hughes development. Lubricant in sealed bearing bits is carried in a reservoir in each third of the bit head. Amount of lubricant maintained in the bearings is controlled by a diaphragm pump actuated by action of cones on bottom. RG-7XJ bearing seal is greatly increasing footage drilled per bit by extending life of bearings. This increase in footage eliminates high percentage of round trips previously required for conventional bits. Performance of sealed bearing bits is improved where recommended weights and rotary speeds are followed. Available in size 7⅞-inch and 8¾-inch.

For more data on above item, circle E236 on postcard, Page 243

Hughes RG-1XJ is equipped with sealed bearings. Cutting structure is the same as the RG-1J. It is designed to drill extremely strong, abrasive formations such as chert, quartzite, granite, flint, novaculite, taconite, pyrite bearing quartzitic formations, and basalt. Sealed bearings have extended life of the bit in the above formations with the heavier weights required to obtain increased penetration. Compacts on the gage and larger compacts on the heel row maintain gage of the hole and reduce gage wear. RG-1XJ is available in sizes 5⅝-inch through 9⅞-inch.

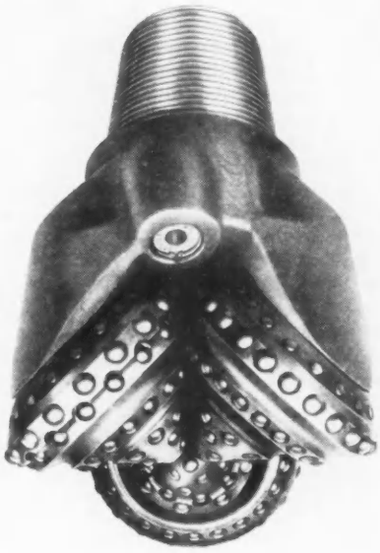


For more data on above item, circle E237 on postcard, Page 243



Hughes RG-7J has been redesigned for faster penetration in formations on the softer side of the RG-1J and the harder side of the W7R-J. Compacts in the gage act as a reamer to more efficiently maintain hole gage. Wider spacing of compacts permits use of larger diameter sintered tungsten carbide compacts that are highly resistant to breakage and allow higher tooth loading. Cone steel is relieved between compacts, minimizing land contact with hole bottom. More compact projection increases drilling rate by permitting deeper bite into the formation. Deep intermesh of compacts provides moderate bottom hole action and removal of larger chips. In comparative bit runs in formations on the soft side of the RG-1J, the RG-7J made 8 percent more footage in 20 percent less time. Penetration rate was 39 percent faster. Available in 7⅞, 8⅝ and 8¾-inch sizes.

For more data on above item, circle E238 on postcard, Page 243



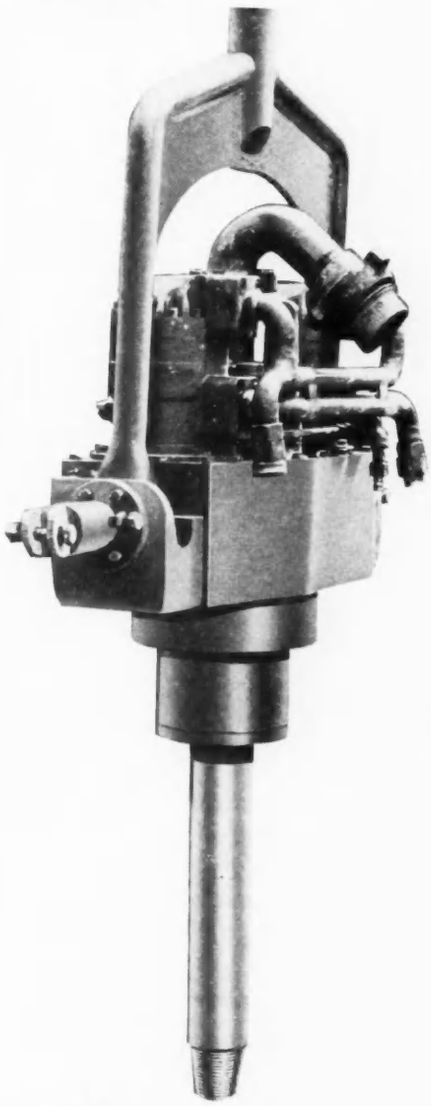
Hughes RG-2BJ has same basic design features as the other "Hugheset" bits. Principal difference is that each cone has a "spearpoint" that is heavily reinforced with sintered tungsten carbide inserts. The gage area of each cone is similarily reinforced. RG-2BJ is designed to drill the hardest and most abrasive formations, partcularly those found to be too hard for the RG-1J. It is available in sizes 8¾, 9, 9⅞, 10⅝, and 12¼-inch.

For more data on above item, circle E239 on postcard, Page 243

Hughes W7R-2 is recommended for use in formations ranging between those ordinarily drilled with the W7 and W7R, and is designed to run with lighter weights than are recommended for W7R. It incorporates these design changes: (1) A steel web connects pairs of heel teeth to form the gage surface and does not extend beyond the connected teeth. A full radial relief cut between connected teeth minimizes effect of inward thrust and possibility of bit being pinched. (2) New gage hardfacing pattern gives increased resistance to gage wear. (3) On 8¾-inch and 9-inch sizes, rate of penetration has been increased through elimination of one row of teeth. (4) Stronger cutting structure has been achieved by lengthening the tooth crest. Available in sizes 6¾-inch through 9⅞-inch.

For more data on above item, circle E240 on postcard, Page 243

Hycalog, Inc.



Scott-Hycalog Power Swivel produces torque necessary for rotating a drill string without use of rotary table or kelly. Torque may be varied by simple hand control, up to a pre-set maximum for each job, a reliable insurance against twist-offs. A visual gage indicates torque. Hydraulic pump is powered by whichever prime mover is preferred: diesel, electric, gasoline or other. It may be located at convenient distance from swivel, with only hydraulic hoses connecting, minimizing danger at well head. Controls, and torque gage, may be located at a third place as operator desires. With maximum bail strength of 30,000 pounds, and a dynamic load capacity of 121,000 pounds at 50 rpm, swivel is suitable for drilling in deepest wells with light weight pipe or tubing. Sensitive surface control afforded hydraulic power should find ready application in slim hole drilling. With a maximum torque of 22,000 inch pounds available from zero to 200 rpm, large surface bits may be turned with heavy drill pipe. Swivel can be purchased or leased.

For more data on above item, circle E241 on postcard, Page 243

Humble Oil and Refining Company

Humblefrac Concentrate is a liquid fluid-loss additive for treating lease crudes, refined oils and residual oils for use in hydraulic fracturing. The liquid form of Humblefrac Concentrate makes it easy to mix and measure precisely. It contains no solids that could cause plugging and other formation damage. Frac fluid return is quick and complete. When sand carrier oils are treated, more of the fluid remains in the fracture system, to extend the fracture and allow propping sand to be placed. Normally, about 2 percent of the concentrate is needed in lease crude to reduce the fluid loss to the desired level. Many crudes require 1 percent or less for satisfactory results. Humble technical personnel will run fluid-loss tests with your lease crude to determine the best concentration. Humblefrac Concentrate is available in bulk, 55-gallon drums and in 14-gallon drums.

For more data on above item, circle E242 on postcard, Page 243

Hypro Engineering, Inc.

Hypro Small-Twin and Big-Twin Piston Pumps develop pressures up to 400 psi, handle a wide range of solutions and suspension-type chemicals. The "Small-Twin" pump weighs 6 pounds, operates at speeds up to 1,800 rpm. Model C5102 has output of 2 gpm at 100 psi; model C5103, 3 gpm at 100 psi. The "Big-Twin" weighs 15 pounds, has

a top recommended speed of 600 rpm with output of approximately 10 gpm. The low-cost 2-cylinder pumps feature an unusual simplicity of design that has resulted in fewer parts for low maintenance and long-life operation. Specifications include ball-bearing construction, a cast-iron body with stainless steel valves, Ni-Resist cylinder sleeves and specially-treated leather piston cups. Intake and discharge ports on the "small-Twin" are tapped ½-inch NPT; on "Big-Twin" models port size is ¾-inch NPT.

For more data on above item, circle E243 on postcard, Page 243

Industrial Clutch Corporation

Over-Center Clutch

Air Operated Gear Clutch

Over-Center, Flex-Disc, Solid Disc, and Gear Tooth Friction Clutches are heavy duty, high quality clutches, dependable in service, with low upkeep and long life. They are adapted for drawworks, drilling and servicing rigs, hoists, spudders, mud pump drives, as well as for compressors and other industrial equipment. Adjustment for wear of the friction facing is quickly made without tool, and replacements are readily made without dismantling the clutch. All clutches have five sets of over-center toggles instead of usual three, affording several times more bearing surface with greater resistance to twist and wear. Available in power range up to 4,120 lbs./ft. torque. Flex-Disc and Gear Tooth Friction Clutches are available for air operation. Construction is the same as in manually operated clutches described above except that an air cylinder replaces the mechanical toggle shift and hand lever. Air engagement and spring-release make them adaptable to remote control where desired.

For more data on above item, circle E244 on postcard, Page 243

Infilco, Inc.

Surflex Diatomite Filter, revised to include 6 trays for flooding, employs a vertical pressure vessel surrounding multiple trays designed to present maximum surface area for filtration through horizontal layers of diatomaceous earth. Filter elements consist of shallow metal trays filled with inert granular material to provide porous non-rigid foundation for a flexible synthetic fabric on which coating of filter-aid rests. Trays are stacked vertically in filter shell and connected into a common header for parallel operation. Liquid entering filter from the bottom is applied to outside of element under sufficient pressure to penetrate coating of filter aid which forms on top of each tray. Solids are retained on the coating, but clear filtrate passes freely through the fabric and granular support bed to the collecting manifold for discharge. Since filter cake remains on horizontal trays by gravity, the filter assures dependable filtration regardless of low or intermittent flow rates.

For more data on above item, circle E245 on postcard, Page 243

International Paint Company, Inc.

Intergard Epoxy Coatings are chemical resistant, providing exceptional protection to metal surfaces exposed to highly corrosive fumes and product spillage. These coatings provide complete protection under many corrosive conditions. Two types are available; the Reactor type, comprising a base and reactor, mixed when used; and the Ester type, which is a ready mixed air drying coating, based on epoxy resins. The Reactor type is an adduct cured epoxy paint having outstanding resistance to chemicals, solvents, abrasion and moisture. The Ester type provides excellent protection in areas where chemical resistance is of prime importance.

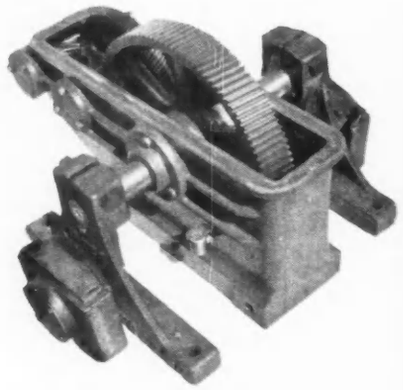
For more data on above item, circle E246 on postcard, Page 243

Jenbacher Werke A. G.

Skid Mounted Diesel Engine Power Pack "JW 600 B" Unit consists of JW 600 Jenbach diesel engine and twin disc torque converter. The diesel engine is provided with dual fuel filters, pre-pump, hand pump, one injection pump with adjustable centrifugal speed governor, centrifugal blower for scavenging, and an air starter. Pneumatic control allows speed adjustment and quick stopping by remote control. Twin disc 3-stage converter includes pump, pressure and temperature indicator. According to load on driven shaft and engine speed, converter supplies torque up to 6 times engine torque. Converter operates on pure diesel fuel or lubricating oil, may be supplied with or without disengageable clutch on drive shaft. Underframe is strong welded construction of skid type. Heavy pivots on both ends facilitate lifting by cranes.

For more data on above item, circle E247 on postcard, Page 243

Jensen Bros. Mfg. Co., Inc.



"B" Model Double Gear Reduction offers the following new design features: Intermediate gears and final load gears are made of nodular iron. Heavy reinforced gear case of one piece design gives accurate parallel in line meshing of the gear train. Heavy reinforced gear case, with nodular iron precision cut gears makes this gear reduction one that will withstand many years of rugged use. Offered as standard equipment on all Jensen Pumping Units.

For more data on above item, circle E248 on postcard, Page 243

Jet-Lube, Inc.

SS-30 Hi-Temp Copper Anti-Seize Compound is specially compounded for threaded members on stainless steels and related complex alloys operating under high temperature. Guaranteed to contain no lead nor graphite. Contains polished, pure copper flakes of micro-fine particle sizing. SS-30 prevents pitting and breakage. Provides a perfect seal for all threads, flanges, and close tolerance fittings. Creates a tenacious armored coating preventing freeze, gall, and tear.

For more data on above item, circle E249 on postcard, Page 243

Easy-Clean is a powerful, yet gentle cleaning agent which emulsifies and saponifies oil and greasy grime, loosens muck, and makes it possible for soil to be washed off with a simple water rinse. This powdered detergent is readily soluble in water. No special equipment nor precaution is required; equally efficient in hard or soft water. Easy on the hands (pH = 9.2), non-toxic in solution, it is harmless to personnel. Containing no caustics, ammonia, nor abrasives, it is non-injurious to painted surfaces. Non-inflammable, it can be used particularly in critical areas of acute fire hazard. Easy-Clean is simple to prepare and economical. Dissolve two to four ounces to each gallon of clean water, apply by brush or rag, rinse off and the job is done—chemically clean. For steam cleaning, dissolve ½-pint to each gallon of solution-tank capacity.

For more data on above item, circle E250 on postcard, Page 243

CB-2 Multi-Purpose Grease is specially manufactured for fast running sheaves of crown and traveling blocks, high temperature anti-friction bearings and journals. It is a multi-purpose lithium grease of highest quality for all general lubrication of deep-hole drilling rigs. Completely waterproof and having an exceptionally high melting point, CB-2 affords greatest protection and stays put in hot fast bearings. Withstands vibration and heavy loadings; reduces grease consumption because of its long lasting characteristics. Packed in bulk and gun-filler cartridges.

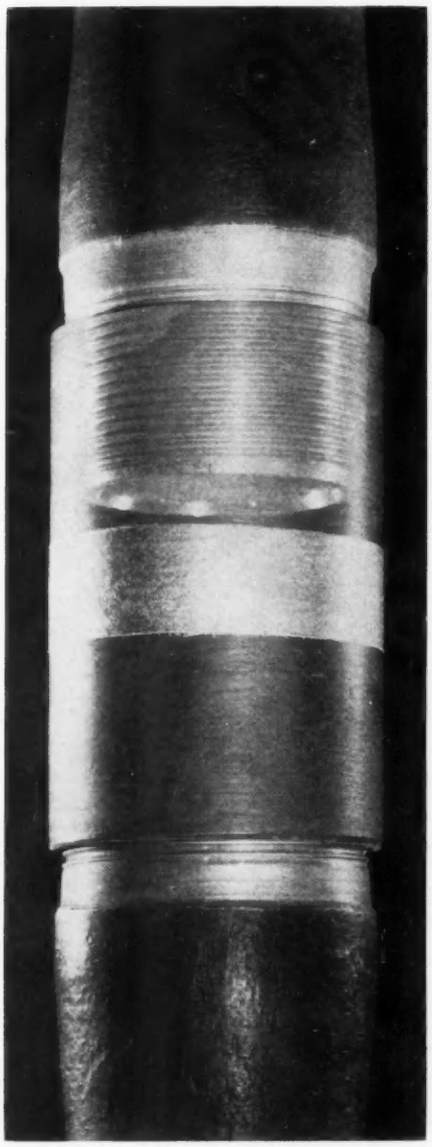
For more data on above item, circle E251 on postcard, Page 243

#20 Moly-Spray contains 20 percent by weight of micro-fine molybdenum disulfide (MoS_2) in a quick drying vehicle for pre-dressing drill collar tool joints prior to initial break-in. It can be brushed on new or recut joints, or may be sprayed on using regular paint spray equipment. It "touches dry" in a few moments and sets up firm in a matter of minutes. Fast drying prevents dust adherence. #20 Moly-Spray forms a smooth, adhering coating of MoS_2 powder over which a conventional drill collar compound can be readily applied. This break-in dressing for drill collars prevents seizure, gall and tear.

For more data on above item, circle E252 on postcard, Page 243

Jones & Laughlin Steel Corporation

Slim Hole Tubing Joint has smallest outside diameter of any threaded and coupled 2⅜-inch external upset tubing. Coupling is machined down to an outside diameter of 2¾ inches. This compares with an outside diameter of 3 1/16 inches on standard API threaded and coupled tubing. It offers operators an



economical solution to the problem of installing tubing in multiple completion wells wtih limited clearance, is suitable for use in wells with average pressures. When both pipe and couplings are the same grade, joint efficiency is nearly 100 percent. For greater efficiency, the use of coupling one grade higher than that of the pipe is recommended. Tubing is available in Grades H-40, J-55 and N-80.

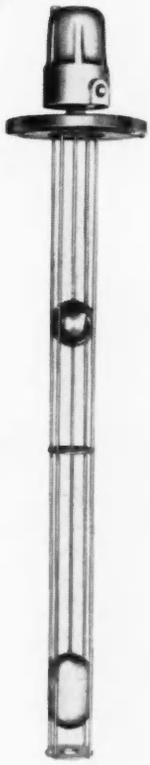
For more data on above item, circle E253 on postcard, Page 243

Jones and Laughlin Supply Division

Major Meter Automatic Custody Transfer Units (MACT), exclusively distributed by Jones & Laughlin, are designed to meet industry need for an "off-the-shelf" meter automatic custody transfer unit. Industry acceptance of Major MACT units, perfected and standardized after years of field experience, and manufactured on a production line basis, indicates that this standard package cuts engineering and experimental costs. Major Engineering Company's seven sizes of MACT units range from 1,000 to 20,500 barrels per day in capacity.

For more data on above item, circle E254 on postcard, Page 243

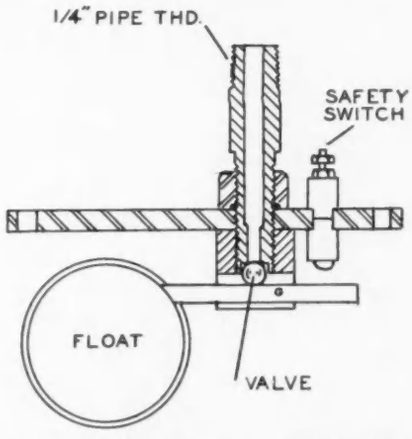
Jo-Bell Products, Inc.



Liquid Level Control is designed with two electrical signals, a high and low level, in one explosion-proof housing. Because it serves as two separate controls, Model KT affords initial economy. Added to this feature are the advantages of a float operated control. It is available for internal installation as shown or for external installation when ordered with float chamber.

For more data on above item, circle E255 on postcard, Page 243

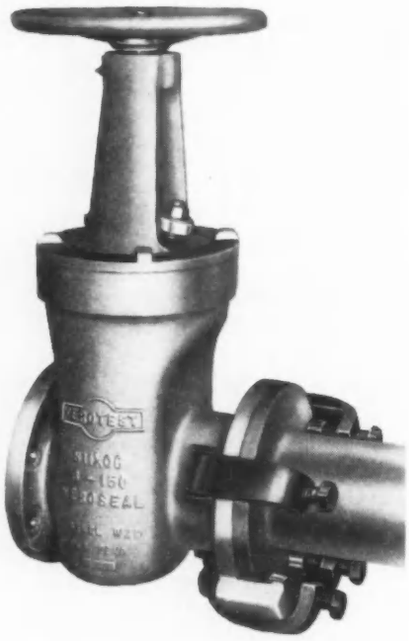
Kenco Engineering Company



Model 507 In Lubricator Oil Controller automatically keeps mechanical lubricators filled with oil from separate supply tank, eliminating manual filling. It fits inside lubricator housing and is available for standard and extra capacity lubricators. The float controlled ball valve regulates the flow to match the lubricator's oil requirements. It has a built-in safety switch to protect equipment from damage due to lack of lubrication.

For more data on above item, circle E256 on postcard, Page 243

Kerotest Manufacturing Company



Dock Valve provides a more practical method of connecting cumbersome flexible tanker or barge hoses to manifold-valve flanges. The valve has one extended flange that allows a workman plenty of hand space between valve body and flange. A number of lugs extend beyond lower lip of stationary-valve flange face, permitting workman to rest heavy hose flange until it is properly aligned. Modified C-clamps attached to extended flange permit making a tight joint between flanges. They also do away with need to align holes or use bolts.

For more data on above item, circle E257 on postcard, Page 243

Walter Kidde & Co., Inc.

Hose and Discharge Horn Assembly is offered for 10, 15 and 20 pound Kidde carbon dioxide extinguishers now in the field. Replacement of older hose-horn assemblies with new equipment will upgrade fire extinguishing ability of older portables equal to Uuderwriters' Laboratories ratings of 8 B:C, 10 B:C and 12 B:C, respectively. No adapters or special equipment required. Simply unscrew old hose and screw in new. A new horn handle clip is included. Existing wall brackets can be reused after insertion of new hose-horn.

For more data on above item, circle E258 on postcard, Page 243

Pressurized 2½-gallon Wet Chemical Portable Fire Extinguishers (water and loaded stream) stress simplified, self-evident operation. Simply aim discharge nozzle at fire and pull trigger. Immediately a stream of fire-killing wet chemical goes to work. There is no trigger locking pin to remove, no valve to turn, no inverting, and no bumping. Center balanced, they are easy to carry. Rugged pressure gages, recessed in handle for added protection, tell at a glance if they are charged and ready for action. Approved by Underwriters' Laboratories and Factory Mutual, the water unit is suitable for use on fires in ordinary combustibles such as wood, paper, or cloth, while loaded stream extinguisher can be used on either ordinary combustible or flammable liquid fires. U. L. fire extinguishing efficiency ratings are: 2½-gallon water: 2-A; 2½-gallon loaded stream: 2-A, 1-B.

For more data on above item, circle E259 on postcard, Page 243

200 and 400 Pound Pressurized Dry Chemical Hose Rack Extinguishers, are Underwriters' Laboratories approved for use on flammable liquid, gas and electrical fires, and can be either wall, floor, or truck mounted. Units feature simple self-evident actuation and nozzle has lever which permits "Off-On" control. Nozzle discharges a universal pattern delivering

an optimum fire extinguishing punch up to 40 feet. Hose lengths of 50 or 100 feet are available. Both units are equipped with exclusive Bridge seal. When units are pressurized with nitrogen or dry air to 450 psi, a force of three tons seal the head, making it virtually leak and tamperproof. Extinguishers are supplied with dust and moistureproof gages which show at a glance their readiness for use.

For more data on above item, circle E260 on postcard, Page 243

200-pound Wheeled Dry Chemical Extinguisher for use on flammable liquid, liquefied petroleum gasses, or electrical fires features a universal nozzle which discharges a dense 40-foot dry chemical stream at a faster rate (total discharge time only 35 seconds). These qualities mean more efficient fire extinguishing action and greater heat protection for the operator. It has an extra 50 pounds of fire-smothering dry chemical—a total of 200 pounds, not the conventional 150 pounds—providing a 33⅓ percent bonus for safety. It's faster to operate, too. No valves to unscrew. No wait for pressurization or for dry chemical to fluff. Just remove safety pin, swing valve toggles, and flip the "on-off" nozzle lever.

For more data on above item, circle E261 on postcard, Page 243

Kimel Company

Fiberglass Canopies are designed to convert any pick-up into a closed-top truck and provide all the advantages of a panel truck with added versatility of being easily converted back to an open-bed truck when needed. The canopies have proved ideal in providing all-weather protection to both men and equipment in exploration, drilling and production operations. Canopies are molded one-piece construction and are made entirely of same fiberglass material and with same construction techniques used in production of premium grade fiberglass boats. Weight of canopies ranges from 100 pounds in smallest model to 150 pounds in the largest. Two men can easily install any model in less than 10 minutes.

For more data on above item, circle E262 on postcard, Page 243

Kimray, Inc.

1200 SMS Motor Valve has inner valve located to utilize vessel heat and prevent freezing. It is recommended for discharge of liquids from vessels where freezing may occur due to high pressure drop. It can be used as a standard angle valve by reversing direction of flow. Connections: Inlet and outlet, 1-inch female, vessel mounting, 2-inch male. Valve is equipped with a patented Teflon packed stuffing box that requires neither adjustment nor lubrication. The inner valve or plug and seat can be quickly replaced. Seat snaps into body with an O-ring seal; no threads to stick or freeze. Seat is made of hardened chrome-moly steel. Plug is carbide.

For more data on above item, circle E263 on postcard, Page 243

J. C. Kinley Company

Kinley Explosive Jar, for 2-inch or larger sizes of tubing, hits a blow many times harder than any rein jar. The Jar will: Knock a stuck choke loose. Put a hole through a bull plug. Take a deep impression with an impression block. The Jar strikes downward with an explosive force which drives a hammer. The force of the explosion is entirely contained within the tool, which can be used again and again immediately after reloading. The tool and operator are available from Houston, Texas or Chickasha, Oklahoma.

For more data on above item, circle E264 on postcard, page 243

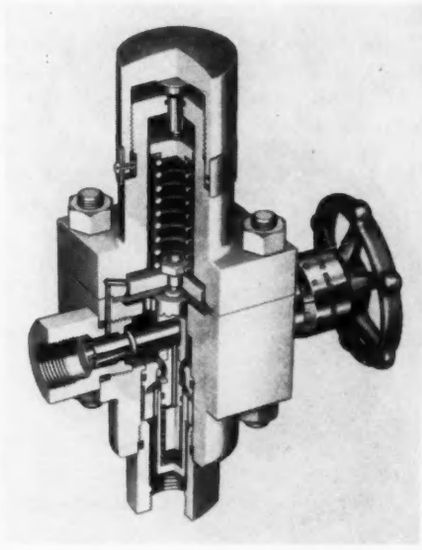
Kinley Microscopic Caliper is an improved instrument for mechanical detection of corrosion in tubing. It is run in the well on ordinary wire line equipment. Calipers are available for measuring corrosion in 2-inch, 2½-inch, 3-inch and 3½-inch tubing. The most important improvement is addition of a recording stylus for each of the measuring feelers. This results in greatly improved degree of accuracy. It also results in ability—for the first time—to measure corrosion that has eaten all around the tubing. Because corrosion can now be recorded circumferentially, an easily read cross-sectional drawing of tubing conditions can be plotted at any level in the well. Another important improvement is the ability to survey as much as 15,000 feet of tubing on a single run, eliminating time-consuming re-runs.

For more data on above item, circle E265 on postcard, Page 243

Kobe, Inc.

High Volume Hydraulic Pumps have tremendously increased the ranges of application of Kobe Hydraulic Oil Well Pumping Systems. New design permits maximum displacement of 540 barrels per day with 2-inch pumps, 1,000 barrels per day with 2½-inch pumps, 1,800 barrels per day with 3-inch pumps, and 3,700 barrels per day with 4-inch pumps. Pumps may be run either as fixed installations (where pump is run on power oil tubing), or as Free Pumps. In latter case, pumps may be circulated in and out of well by simply turning a valve at the wellhead. Both fixed and Free Pumps may be run as tubing installations or casing installations.

For more data on above item, circle E266 on postcard, Page 243



Constant Flow Controller, recently modified, provides accurate "direct dialing" of flow rate required. This is accomplished with a vernier-type indicator attached to handwheel stem. The valve is angle-type, has 1-inch connections, 5,000 psi CWP, capacity 0 to 1500 barrels per day. For any given setting, the valve provides a constant rate of flow regardless of pressure differential. Diaphragm operated pressure-reducing valve within the body is tungsten-carbide trimmed to provide exceptionally long life in crude oil or water service. Designed for any hydraulic power application where it is necessary to achieve a constant flow rate under conditions of varying pressure requirements.

For more data on above item, circle E267 on postcard, Page 243

Kraloy Plastic Pipe Company

Polyvinyl Chloride Rigid Conduit has been approved by Underwriters Laboratories for encasement in concrete or direct underground burial. In raceways required for electrified leases, timers, lighting at tank batteries and the many other conduit requirements in produc-

tion, PVC solves corrosion problems. Besides the anti-corrosion features, Kraloy PVC is easy to install and maintain. It will not support combustion, is not a conductor of electricity, and is non-sparking. 1/6 the weight of steel and ½ that of aluminum, PVC is easier to transport and handle on the job.

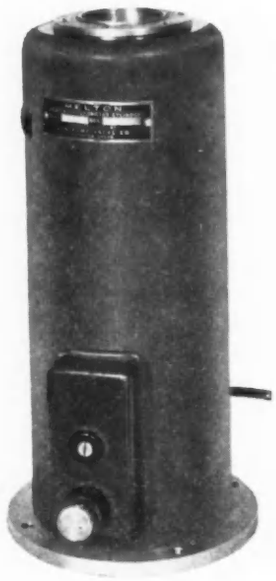
For more data on above item, circle E268 on postcard, Page 243

L-K Pump Valve Company

L-K Non-Heating Centrifuge is a sturdy, compact unit featuring heavy gage cast aluminum housing. The 6 and 12 volt DC models utilize rheostat switches while the 115 AC volt models are made with push-pull switches. All models are equipped with pilot light to indicate machine is running, and hole in lid for tachometer checking. Speed and diameter of swing conform to ASTM specifications. Machines are made in 6 and 12 volt DC and 115 volt AC models for either 12.5 ml API or 100 ml ASTM tubes. They are 11 inches high and 19½ inches in diameter and weigh only 38 pounds. Shipping weight is 48 pounds.

For more data on above item, circle E269 on postcard, Page 243

L-K (Melton) Heating Hydrometer Cylinder heats crude for gravity readings. This improved type of heating hydrometer cylinder provides a practical way of heating samples of waxy crudes so that hydrometers will float in them, thus assuring correct gravity readings. The cylinder is explosion-proof and is of all-aluminum construction. The unit has a strip-type heating element which may be easily replaced in the field. It has a



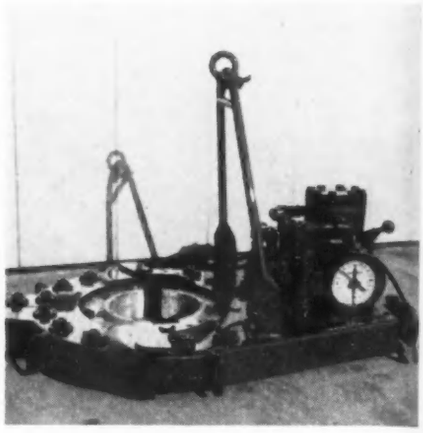
thermostatically controlled heating range of approximately 50° to 240° F. and is furnished with removable Pyrex inner cylinder. Inside dimensions conform to API specifications. The cylinder can be furnished for 6 and 12 volts DC or 115 volts AC.

For more data on above item, circle E270 on postcard, Page 243

Electric Heating Centrifuge for 6 and 12 volts sacrifices none of the features of previous models, but is much more compact and lighter in weight. A cast aluminum case and specially designed motor are but two of the recent improvements. This streamlined model takes up a minimum of room and is easily installed or removed. No plumbing is required and the car engine does not need to be kept running to keep unit functioning. Outside temperature has no effect since heat in cups is controlled by two-stage resistor switch.

For more data on above item, circle E271 on postcard, Page 243

Lamb Rental Tools, Inc.

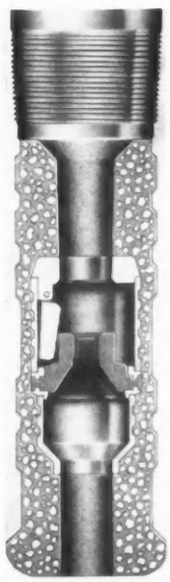


Hydraulic Powered Casing Tong has a 32-inch handle, weighs less than 1,000 pounds, develops 15,000 foot pounds of torque with ease, has complete speed control from 0 to 100 rpm, and will run any size casing from 4½-through 13⅜ inches. Gripping action is automatic and can be reversed instantly without removing tongs from pipe. Full rotating power tongs applied in either reverse or forward. Gripping members have virtually 360° contact with pipe, providing a sure but gentle gripping action that won't crimp or slip under maximum loads. Versatile hydraulic speed control allows gentle handling for low torque requirements. Maximum applied torque can be set so as not to overtorque the pipe being run beyond desired recommendation. Continuous double pinion drive provides adequate strength at maximum torque with only half the normal rotary thickness. Can be converted to an air-driven tong. Tong was selected to run world record string of 10,504 feet of 13⅜-inch OD Casing in Southwest Louisiana.

For more data on above item, circle E272 on postcard, Page 243

Larkin Packer Company

Circulating Filrite Cementing Equipment makes possible a non-stop casing run without pressure surges, but still permits full downward circulation when necessary. Equipment has no depth limitations. Designed for automatically filling the casing from the bottom while casing is being run, and to allow downward circulation through casing at any time during casing run. A resilient diaphragm valve permits continuous but restricted bottom-fill which is sufficient to



maintain adequate casing fill without overflow. Flapper-type valve is maintained in open position by an aluminum retaining bar which is held in place with a shear screw. It is released by dropping a ball which shears the screw as it passes through valve mechanism, is spring loaded, and provides a positive back pressure seal which has no depth limitations. Equipment has been thoroughly field tested and is available through all Larkin locations throughout the United States and Canada.

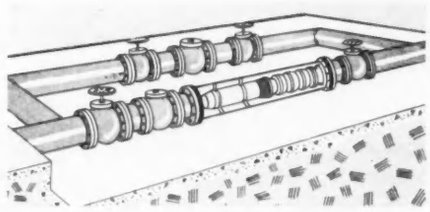
For more data on above item, circle E273 on postcard, Page 243

Type H and Type Q Larkin Tubing Heads bring to low-pressure field a new line of economical, high quality, slip-suspension tubing heads. Type H, with male connection only, is rated 500 psi working pressure; Type Q, with female connection only, is rated 750 psi. Heads are full opening in all sizes, and available in sizes from 2-inch Reg. or EUE tubing through 7-inch OD casing. Three segment hinged slips will suspend up to 5,000 feet of ¾-inch through 2½-inch EUE tubing or up to 3,000 feet of 3-inch Reg. through 4-inch EUE tubing. Cast parts are ductile iron pressure castings with more than adequate wall sections to provide generous safety factors. Steel parts are made of J-55 casing or forgings with equivalent properties. Heads employ Hycar Packing Rig made of high quality oil and gas resistant compound. Threads are current API to accommodate valves or other control equipment. Spider Base and Pipe Wiper are included. Pipe Wiper holds pressures within ratings of heads. Spider Base serves as thread protector and base for tubing spider during workovers.

For more data on above item, circle E274 on postcard, Page 243

Layne & Bowler Pump Company

Power-Line Submersible Pump is designed for secondary recovery operations and other pipe line booster applications. Pump and motor assemblies are placed horizontally inside pipe line, thus simplifying installation and saving space in the overall hook-up. Other features include



noiseless operation, protection of motor from dust, heat and moisture, elemination of pump houses and their maintenance problems, and greater convenience in handling overall hook-up. The submersible unit is fitted into a special section of the pipe line that is flanged at each end and becomes an integral part of the line. Within this section special spiders hold motor and pump unit in permanent, close-coupled alignment. The fluid being pumped passes around motor and into pump unit, where it is boosted along at increased pressure. The submersible power cable is clamped rigidly to pump unit and leads to a terminal box on the outside, from which any type of control unit can be connected. Pump is available in wide range of sizes.

For more data on above item, circle E275 on postcard, Page 243

LeBus International Engineers, Inc.

LeBus Knuckle Joint-Overshot System makes fishing operations faster and more effective. Angling increases the area in which the top of the fishing tool can grasp the fish laying in a well cavity. The full bore permits use of inside cutters. It is ideal for use with wash pipe spear and pipe where top of stuck drill stem is in cavity. The ball and socket construction permits heavy duty pulling, rotating and jarring.

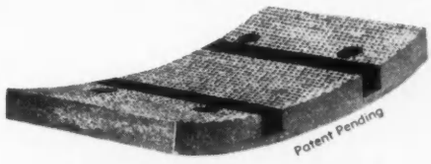
For more data on above item, circle E276 on postcard, Page 243

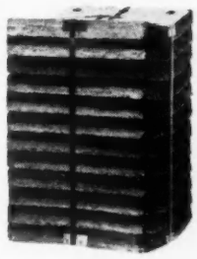
Leland Equipment Company

Low Boy Trailer (Model TL-25D) has 25-ton capacity with 20,000 pound axles, 12½ x 5¾ air brakes and cast iron spoke wheels. Length of platform is 13 feet, width is 8 feet, and overall length from rear of the gooseneck to end of ramp is 23 feet. Clear length gooseneck on Low Boy is 80 inches, king pin setting is 18 inches and length from king pin to end of ramp is 30 feet-10 inches. As an extra cost item, six side brackets may be added to extend width of unit to 10 feet. Trailer is equipped with ICC lights and reflectors, turn lights, 8-inch "D" rings and 2¼-inch hardwood flooring. Height of platform with 9:00 x 15 tires is 38¾-inches and approximate weight of unit is 9,800 pounds.

For more data on above item, circle E277 on postcard, Page 243

Lewis Manufacturing Company





Lewis Insert Brake Lining provides highly efficient braking and longer life for brake blocks. Lewis brake lining is now available with two heavy duty blocks for each drum side, equipped with special moulded asbestos wiper inserts, which aid in maintaining smoother drum flanges because of wiping action and a more even distribution of frictional torque around drum flange. Advantages of both woven and moulded material are thus obtained, plus prolonging life of lining and brake flanges and maximum braking effectiveness.

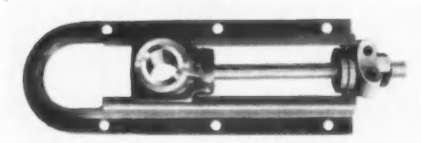
For more data on above item, circle E278 on postcard, Page 243

Leyland Motors Limited

Power-Plus Heavy-Duty Cab-Over-Engine Leyland Diesel Trucks have gross ratings from 31,360 to 53,760 pounds. Fifteen haulage, tipper and tractor models are offered in a variety of wheelbases, and an exceptionally wide choice of major units. They can be powered by a new 677-cubic inch Leyland Power-Plus diesel developing 200 horsepower at 2,200 rpm or a new super-economy 597-cubic inch Power-Plus diesel which develops 140 horsepower at 1,700 rpm. As well as alternative engines, they have a 5, 6 or 7-speed gear-box, single or double-drive bogies for multi-wheelers with alternative systems of suspension, and easy-access "Vista-Vue" cabs in all steel or reinforced glass-fibre on a steel sub-frame. Their standard specification also includes power steering, power handbrake, power-assisted clutch, and diaphragm air brakes.

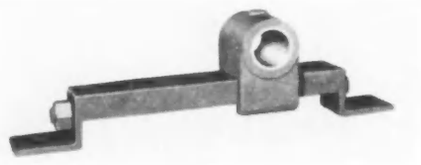
For more data on above item, circle E279 on postcard, Page 243

Link-Belt Company



Series AS 2600Z Bronze Bearing Take-ups are designed for use on conveyors or elevators where service is moderate. They may be mounted vertically or horizontally on sides of casing or on supports. Frames of pressed steel assure maximum strength with minimum weight. Bearing blocks are mounted perpendicular to base of frame. Twenty-four new sizes are available in this series. In all, Link Belt has added 74 new sizes, in three new series, to its line of babbitted and bronze bushed bearing takeups. Now offers off-the-shelf delivery on more than 10 types and 200 sizes for commercial shafting to 5 15/16 inches.

For more data on above item, circle E280 on postcard, Page 243

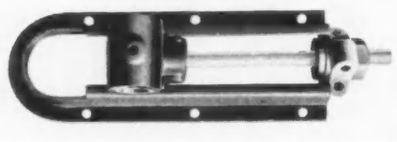


Series N 3000Z Bronze Bearing Take-ups are particularly adaptable for use on moderate duty chain or belt conveyors or other special equipment. The rigid, compact, welded channel frames protect the screws and provide ample strength with minimum weight. The design allows maximum possible adjustment within limited installation space. Link-Belt added 26 new sizes to this series.

For more data on above item, circle E281 on postcard, Page 243

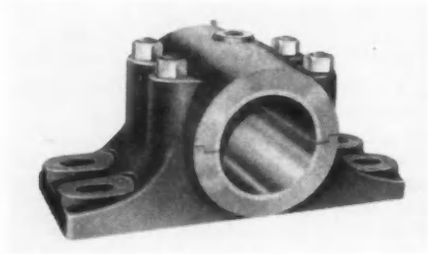
Series 2-1400 Babbitted and 2K-1400Z Bronze Bearing Pillow Blocks. Series 2-1400 pillow blocks have split, gray iron housings with babbitted bearings. Series 2K-1400Z pillow blocks have split, cast steel housings with bronze bearings. Both blocks have four-bolt bases and machine finished gibbed joints. They are used for a variety of applications where heavy side pressures are present and where removable caps are advantageous. Sixteen new sizes have been added in this series.

For more data on above item, circle E282 on postcard, Page 243



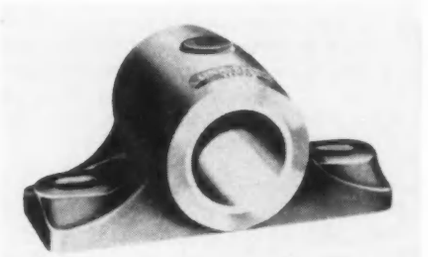
Series BS 2700Z Bronze Bearing Take-ups have the bearing blocks mounted parallel to the base of the frames. They are generally used on moderate duty conveyors and elevators and are usually mounted on structural supports. Twenty-four new sizes are available in this series.

For more data on above item, circle E283 on postcard, Page 243



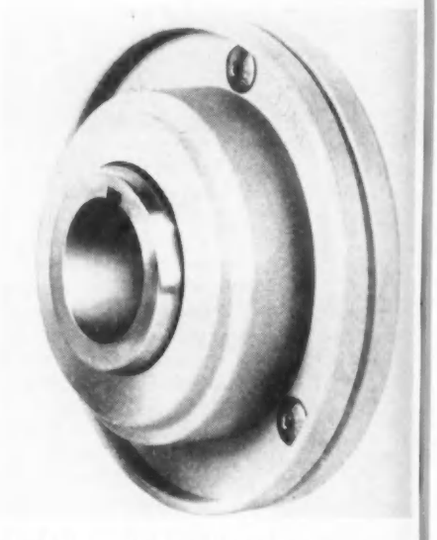
Series 2-1500 Babbitted Bearing and 2-1500Z Bronze Bearing Pillow Blocks. Series 2-1500 pillow blocks have split, gray iron housings with babbitted bearings. Series 2-1500Z pillow blocks also have split, gray iron housings with bronze bearings. Both these pillow blocks have four-bolt bases and 40-degree angular joints. They are well adapted to applications involving heavy angular loads and where removable caps are required. Link-Belt added 15 new sizes to this series.

For more data on above item, circle E284 on postcard, Page 243



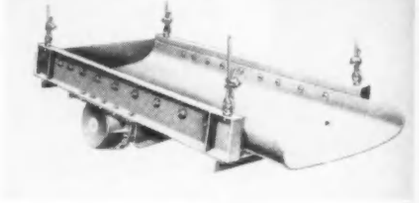
Series 1000Z Pillow Blocks, solid gray iron housing with bronze bearings. These pillow blocks have two-bolt bases and are used for general applications where cap removal is not required. Fourteen new sizes have been added in this series. In all, Link-Belt has added 45 new sizes, in five new series, to its line of babbitted and bronze bearing blocks. Now offers off-the-shelf delivery on more than 15 types and 300 sizes of solid, split, gibbed, angle or flanged pillow blocks for commercial shafting up to 12 inches in diameter.

For more data on above item, circle E285 on postcard, Page 243



MC Geared Flexible Motor Couplings have three new features: (1) New corrosive duty covers of polypropylene for operating conditions under which chemical attacks can occur. (2) Larger size coupling, extending range of the line to 2½-inch bore. (3) New spacer adapter which functions as a demountable, rigid extension of the motor shaft.

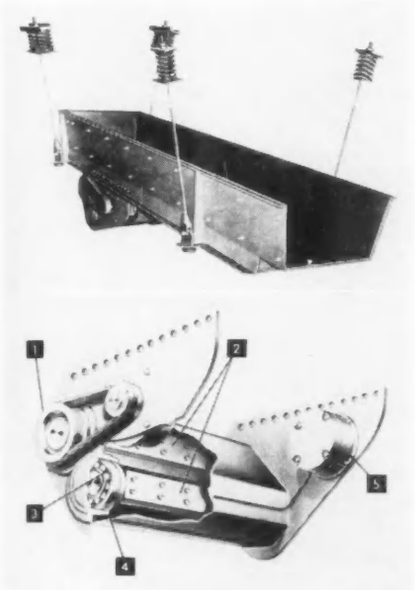
For more data on above item, circle E286 on postcard, Page 243



MC Motorized Counterweight Vibrating Feeders consist of a trough and either a single or double motorized vibrator drive, mounted directly to the rugged channel frame. Vibrator is driven by motors with a double-extended shaft on which counterweights are mounted. Unbalanced arrangement of counterweights imparts a straightline oscillating or vibrating motion to the trough, lifting the material upward and forward along the trough length. These machines are compact, low headroom devices for feeding a wide range of bulk materials at a uniform rate. MC Twin Motor Feeders include 31 sizes with capacities from 275 to 1,700 t.p.h. Also, 18 new single motor

feeders have been added to existing line with capacities from five to 525 t.p.h. Feeder lengths range from four to 14 feet; trough widths from one to six feet; and capacities from five to 1,700 t.p.h. With new additions, Link-Belt offers more than 60 sizes of MC feeders with capacities up to 1,700 tons per hour.

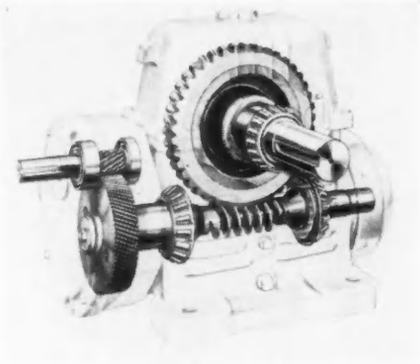
For more data on above item, circle E287 on postcard, Page 243



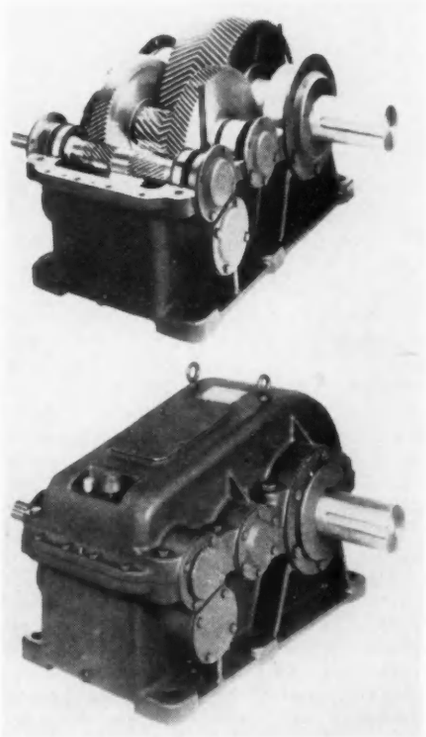
Straightline Vibrating Feeders incorporate a new principle of vibration for high-capacity, controlled feeding of heavy and highly abrasive bulk materials. Synchromatic vibrator produces its high-intensity feeding motion by two unbalanced shafts driven in opposite directions by rugged individual pancake motors. The combination of speed, stroke intensity and straightline action of the vibrator results in effective feeding. Two models can be either cable-suspended or floor-mounted, are available in 30 sizes with capacities up to 1,350 t.p.h. Reinforced universal brackets provide for floor, ceiling or combination floor and ceiling mounting. Selection and application data based on feeder size and total vibrating weight are also given.

For more data on above item, circle E288 on postcard, Page 243

Fan-Cooled Worm Gear Speed Reducers (Type HWB500) are right-angle drives which adapt compact, high speed motors to modern production machines. They can operate at high input speeds and cover the range from fractional to large horsepower motors. They offer low output speeds with ample capacity for heavy loads, assuring smooth, quiet transmission of power with minimum maintenance, and have housing that combine strength, rigidity and ample cooling area. The fan cooling and other design refinements allow size of units to be reduced while retaining their high load carrying capacity. Automatic lubrication is provided by a splash system between the oil reservoir and internally cast channels to the bearings except on the low-speed shaft, where grease fittings are provided. Oil seals are furnished on all shaft openings. They are available in 25 types and over 135 different sizes. Ratios range from 5:1 to 3600 :1, with torque ratings up to 135,000 pound inches and horsepower ratings up to 150.

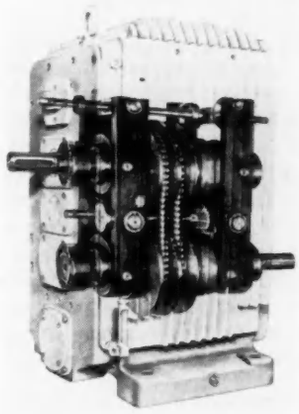


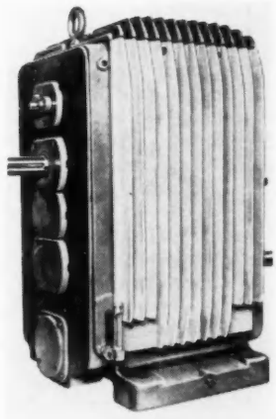
For more data on above item, circle E289 on postcard, Page 243



Balanced Design Parallel Shaft Speed Reducers are now available in 57 sizes. With 23 new sizes added to the line, drive selections can now be matched more closely to horsepower requirements with a resultant saving in drive costs. Single, double and triple reduction units are available in capacities up to 2,800 horsepower at high or low output speeds and ratios up to 292:1. Shafts can be arranged to suit specific drive requirements, and unique design permits assembly with single shaft projections in either direction or with double shaft projections. Single reduction units are available in 17 sizes with ratios up to 9.78:1 and capacities to more than 2,800 horsepower; double reduction in 20 sizes with ratios from 11.4:1 to 70.6:1 and capacities to more than 1,700 horsepower and triple reduction in 20 sizes with ratios from 31.4:1 to 292:1 and capacities to more than 900 horsepower. Extra-tough welded steel housings are available to withstand severe external abuse.

For more data on above item, circle E290 on postcard, Page 243





RS-33 P.I.V., a new constant-horsepower variable speed drive designed to meet capacities up to 50 horsepower and ratios up to 5.5:1, is extremely compact for its high horsepower rating. It gives simple, quick and precise speed control and meets infinite speed-varying requirements, offering positive power transmission through entire speed range. Drives of 3.8:1 and less can be directly coupled to a 1,750-rpm. motor. Available in five types: basic drive, basic drive with output gears, basic drive with input and output gears, basic drive with integral foot-type motor and basic drive with integral foot-type motor and output gears. Twin strands of unique single roll chain operate between a pair of facing wheels having a floating center disc. Effective diameters of wheel faces are altered during operation, changing ratio and output shaft speed.

For more data on above item, circle E291 on postcard, Page 243

Lufkin Foundry & Machine Company

Lufkin Model H2165 Gas Engine is rated at 145 bhp at 475 rpm. The Lufkin Model H1770 Gas Engine is rated at 120 bhp at 475 rpm. Both of these engines have a 12½-inch stroke and are twin cylinder two cycle horizontal cylinder heavy duty type made for operation on natural gas. Twin cylinders result in less shock to equipment. The flexible speed range of 200 to 475 rpm allows a wide usage either for direct connected or V-belt drive of pumping units, water flood pumps, hydraulic pumps, or general oil field power. Lufkin Engines are furnished as a complete power unit with built-in thermo-syphon cooling, full pressure lubrication and built-in safety controls. Such features as oil cooled pistons, tachometers, gas injection and a wide range of starting systems are available at extra cost.

For more data on above item, circle E292 on postcard, Page 243

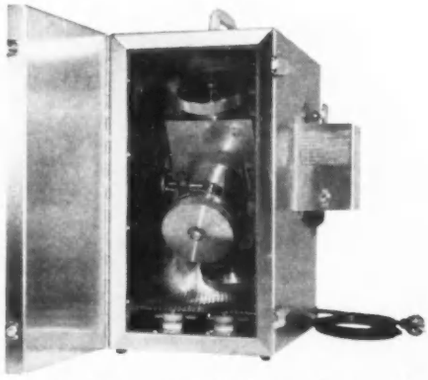
M & V Tank Company

SHH Horizontal Separators are the result of years of field design and experience combined with top quality fabrication to produce the latest horizontal high pressure monotube separator. Initial separation is begun at the end of vessel by inlet diverter to utilize complete length of vessel. Gas then passes through a primary scrubber that strips gas as it impinges on intricate self-cleaning faces of scrubbing element. Foam that is a problem to other separators is broken by primary scrubber. Further assurance of dry gas to the sales line is made by passing the gas through a wire mesh mist extractor. Fluid is directed to lower half of vessel offering a large interface between phases. Solution gas is released within the vessel, to be sold and not retained by fluid to be vented later. The level control is protected from solids by a baffle, and solids carried by fluid are discharged from vessel with fluid and not allowed to accumulate. Controls and accessories are of field proven and accepted lines.

For more data on above item, circle E293 on postcard, Page 243

Magnet Cove Barium Corporation

Portable Field Oven provides fast, accurate testing of drilling mud stability at high temperatures. Measuring 9½ x 15⅞ x 17 inches outside and 7 x 13 x 15 inches inside, and weighing only 46½ pounds, the new unit is ideal for use at drilling site. Oven can test two or four mud samples at one time. In testing,



samples are sealed in heavy-duty stainless steel containers and mounted in brackets on a rack which can be rotated at 32 rpm. A switch also permits testing of mud without rotation. Forced air circulation in conjunction with rotation of mud samples provides uniform heating throughout oven. Oven can be wired for 7.5 amps at 110 volts AC or 3.75 amps 220 volts AC without modification of any parts.

For more data on above item, circle E294 on postcard, Page 243

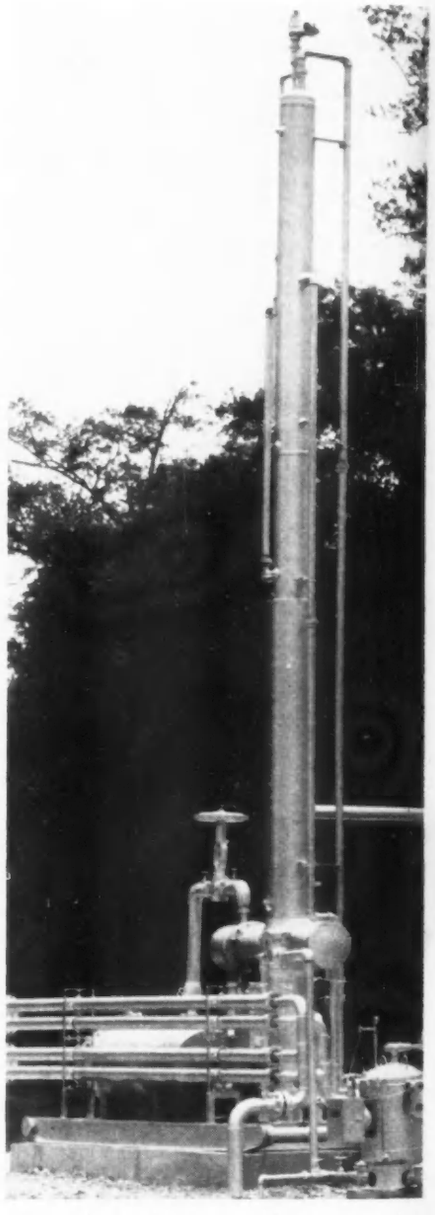
Magnetrol, Inc.

High Pressure, Low Specific Gravity Level Control Unit is designed for oil field and refinery applications, particularly on "scrubber" service. Construction is of welded steel with totally enclosed stainless steel float. Float chamber may be either screwed or with various combinations of flange connections. Coupling between float mechanism and switch head is standard Magnetrol "magnetic link," completely eliminating leaks, service and possible failures at the pressure seal. This design permits compact and economical construction even at extremely high pressures. Pressures as high as 2,000 psi can be handled by standard models. Specific gravities as low as .35 can also be handled by standard units. Control model is one of two standard types: (a) vibration-proof mercury switch mechanism with an explosionproof-vaporproof control head; (b) pneumatic 2-position with internal toggle lever arrangement for changeover from direct to reverse acting.

For more data on above item, circle E295 on postcard, Page 243

Maloney-Crawford Tank and Mfg. Company

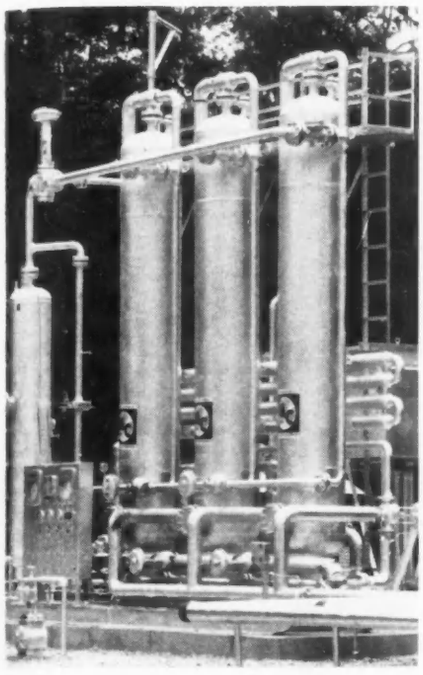
Auto-Reflux Stabilizer employs a unique design to increase recovery of condensate. Key to higher efficiency is a heat exchanger built into top of column. The stabilizer uses throttling cooling of the column feed itself to cool column of



gas and provide a rectification section and reflux to the column. It generates its own reflux. Auto-Reflux recovers heavier components in the vapor leaving the column's exhaust system. In a conventional stabilizer, no recovery is made after the vapor leaves exhaust section. It will operate efficiently with feed temperatures at 85 degrees F., or higher. Using this stabilizer, stock tank liquid recovery has been improved from 5 to 25 percent, depending on feed conditions and the required vapor pressure of the product.

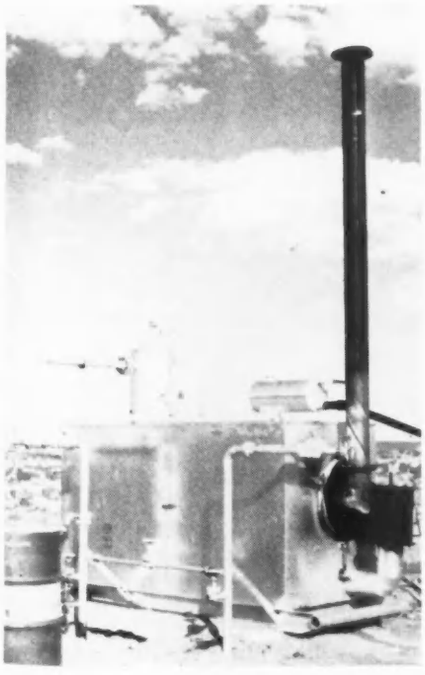
For more data on above item, circle E296 on postcard, Page 243

Hy-Sorb Three-Tower Dry-Bed Gas Dehydration and Hydrocarbon-Recovery Unit performs three functions: absorbing, heating, cooling. There is a separate tower for each function, giving increased efficiency because each tower does only one job at a time. Also, cycling time is much shorter than with a two-tower unit, either open or closed system. Hy-



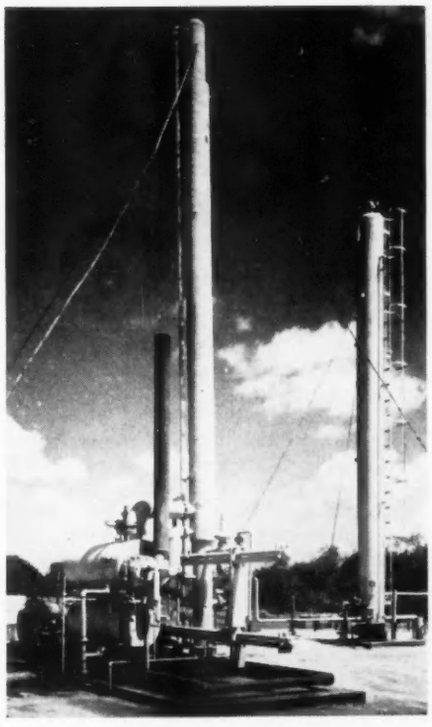
Sorb is an open-cycle unit. Regeneration gas is split off main stream by pressure drop. After hydrocarbon is recovered, gas is recombined for sale. Maintenance is substantially reduced because there are no pumps, compressors, motors, seals, bearings, etc. Open-cycle control system has been simplified. Initial cost is about the same as a two-tower closed cycle unit, but maintenance and operating costs are greatly reduced.

For more data on above item, circle E297 on postcard, Page 243



Bun-in-the-Oven, Trop-I-Gas, and Tri-Treat are new winterized production units specially developed for cold weather use. Bun-in-the-Oven Separator is submerged in the heater. Separator temperature is controlled directly by the heater, thus assuring a safe static operating temperature. Separator can be three-phased at the factory or in the field by adding the valve and level controller. In the Trop-I-Gas unit, a steam generator furnishes heat through a coil to liquid section of separator. It also serves as an indirect heater to warm all or any portion of incoming stream. Gas temperature is maintained at most efficient level by use of a temperature controller and three-way blending valve. Tri-Treat is a complete cold-weather heater, treater, two-stage separator package. The fire-tube, in the low-pressure separator-treater, provides direct heat to the second stage and indirect heat to the inlet stream. High-pressure separator is equipped with a special punched defoaming section which gives added gas scrubbing and better separation of high pour-point liquids.

For more data on above item, circle E298 on postcard, Page 243



Sweet-A-Mine is a natural gas desulfurizer with an automatic system for removing hydrogen sulfide and carbon dioxide from gas. This is done by absorbing acid gases in a solution of monoethanolamine in water, and regenerating the sour amine solution for re-use. The desulfurization plant is in two assemblies, absorber and regenerator. These assemblies are connected in the field for circulation of the amine solution. Plants too large for skid-mounting of the regeneration assembly are furnished with all accessories, but less the piping and assembly required for field installation.

For more data on above item, circle E299 on postcard, Page 243

Manzel, Unit of Houdaille Industries, Inc.

Manzel Lube-Line Alert is the only control of its kind on the market which will accurately monitor oil actually on the way to point of lubrication. It acts as a sentinel to indicate flow or no-flow at any point in compressors, pumps, engines, and equipment employing any make or type of force feed lubrication system. One Lube-Line Alert per pumping unit will warn of flow stoppage resulting from low reservoir lubricant level, shaft rotation stoppage, broken lubricant lines, dirt under pump valves, and worn plungers. One Alert per lubricator will warn of low reservoir lubricant level or shaft rotation stoppage. Operating under continuous or intermittent low-flow rates, the Alert provides low-cost, dependable protection for costly machinery.

For more data on above item, circle E300 on postcard, Page 243

Marine Products Company

Duraflex Model 7200 Pump is recommended for circulation of tank bottoms, transfer of crude oil, water charging, brine disposal, fuel transfer, and a paraffin removal. Does not require use of a reduction gear—the pump being direct coupled to the air cooled engine. Synthetic rubber impellers withstand abrasive action of tank bottom sediment. Bronze impellers are available for use in pumping hot liquids. With a rated capacity of 40 GPM at 100 psi, it also is recommended for use in fire fighting, water charging, fuel transfer, dewatering, and general utility work. Total weight including engine is 106 pounds. Pipe size connections are 1½-inch x 1½-inch.

For more data on above item, circle E301 on postcard, Page 243

Marland One-Way Clutch Company

Marland One-Way Type HB Automatic Freewheeling Clutch is used for oil drilling rigs equipped with hydromatic brakes. It functions automatically to instantly connect the brake when drill-

ing line is lowered and to instantly freewheel to disconnect brake when line is being raised. Sizes are available for 15-inch through 60-inch hydromatic brakes. New design now provided with easily maintained grease seal plates to exclude sand, water, grit or other foreign matter. Cylindrical rollers are uniformly and safely caged so they cannot fall out in sand or mud whenever clutch is opened in the field for inspection.

For more data on above item, circle E302 on postcard, Page 243

Martin-Decker Corporation

GB-23 Stem Gage is a pressure gage for christmas trees, compressor plants and other heavy duty applications where a rugged, accurate gage is desired. Five-inch gage is fluid-filled to reduce severe pointer movement and to protect and lubricate working parts. It is equipped with an adjustable damper to set the pointer at proper sensitivity. Gage has an accuracy of ½ of 1 percent and is available in capacities of 1,500, 3,000, 5,000, 10,000 and 15,000 psi.

For more data on above item, circle E303 on postcard, Page 243

GA-60 Compound Pressure Gage incorporates high capacity with a four-to-one vernier pointer which provides sensitivity of a lower capacity instrument. Gage is 6-inch fluid filled with a damper for setting pointers to proper sensitivity. There are two pointers—one for reading total pressure, and the other, geared 4 to 1, provides easier and more accurate reading of the exact pressure. Gage has an accuracy of ½ of 1 percent and comes in capacities of 4,000, 8,000, 12,000, 16,000 and 20,000 psi, with metric equivalents available. There are many applications in the oil field where a gage of high capacity is required and yet customer desires very sensitive indications of pressure changes. Compound Gage provides an accurate and rugged instrument for these applications.

For more data on above item, circle E304 on postcard, Page 243

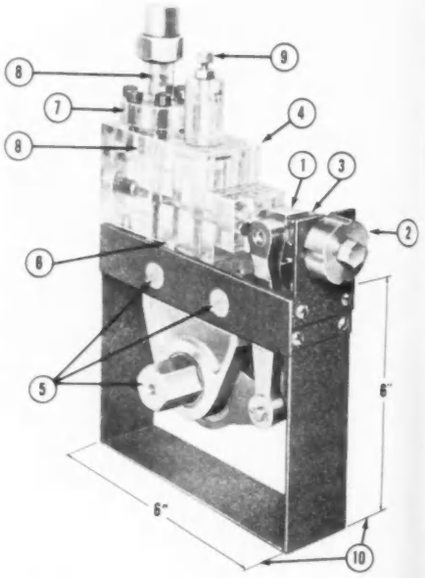
Mayhew Supply Company, Inc.

Mayhew Model 5000 Drilling Rig is capable of drilling to 5,000 feet with 4½-inch drill pipe or 8,500 feet with 2⅞-inch drill pipe. Drawworks, rotary and engine are integrated into single substructure trailer, eliminating additional weight of skid mounting. One diesel serves to power drawworks and mud pump. Drawworks input horsepower is rated at 400. Model 5000 utilizes propeller type drive shafts rather than conventional chain drives to rotary table, slush pump and transmission. The 94-foot mast exceeds API specifications and is capable of racking 9,700 feet of 2⅞-inch drill pipe or 5,400 feet of 4½-inch drill pipe. It may be equipped for air or mud. Substructure is high enough to take a double BOP and Shaffer rotating head. The rig moves complete in nine loads, not counting compressors which may be rented. A full line of accessory equipment, rated at 100 tons or better, is available.

For more data on above item, circle E305 on postcard, Page 243

McCord Corporation

Model HVR 35 High Pressure Force Feed Lubricator is a multi-purpose lubricator designed for pressures up to 35,000 psi. Features include: 1. New floating design crosshead drive on plunger. 2. Simple self-lock adjustment with graduated scale. 3. Powerful drive utilizing double forged steel rocker arms. 4. Solid alloy steel block pump body. 5. Unique 3-point suspension drive confines driving torque to each individual pump. 6. Key lock on each pump eliminates bolt shear. 7. High pressure flanged bolt design on discharge connection. 8. All valves easily accessible for cleaning and inspection. 9. "Quick-Vent" permits oil accumulation in glass to be cleared. 10. Compact size with ample oil reserve. 11. Complete field flexibility. Rugged building block design allows inventory of basic components to speed up manufacture of many complex combinations. Addition of extra feeds or reservoirs in the field is easily possible. Operates by electric gear motor or directly from machine being lubricated.



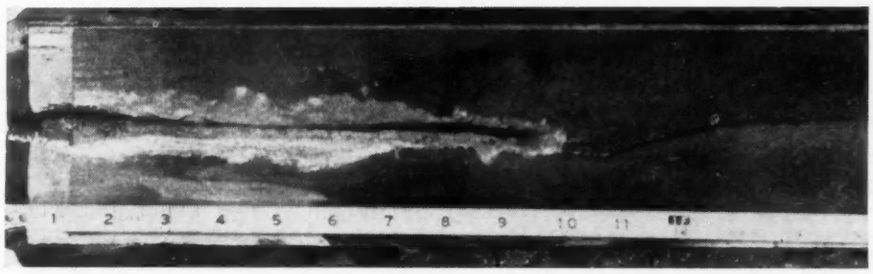
For more data on above item, circle E306 on postcard, Page 243

McEvoy Company

Fabricated Quadruple Tubingless-Completion Christmas Tree is designed for 5,000-pound WOG working pressure, 10,000-pound test. The new fabricated tree costs less, and over-all height has been reduced considerably. McEvoy automatic, self-sealing type MOS valves have been used to build a double master valve into each string, giving added safety for high working pressures of tree. Eight valves are used in vertical run of tree. The tubing head adapter has plastic

packing elements for each string. A five-bolt connection is used to seal off above flange. Four strings of 2⅞-inch upset tubing inside 9⅝-inch casing are controlled by the tree. Tees are fabricated into each string with wing valves and chokes attached.

For more data on above item, circle E307 on postcard, Page 243



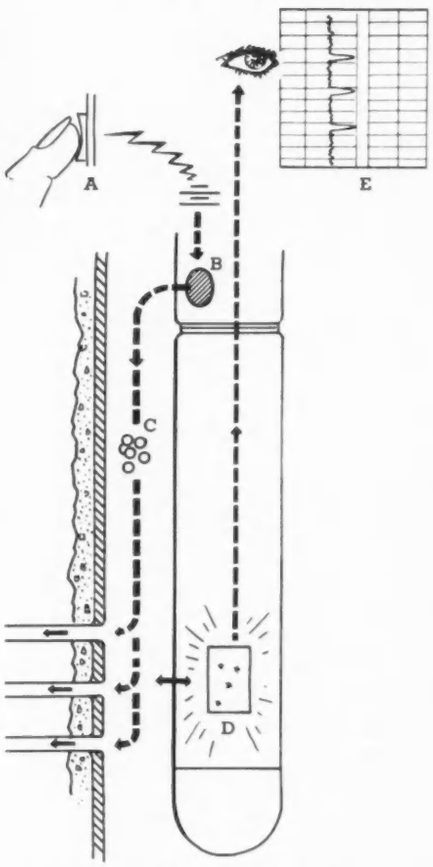
McCullough Tool Company

Triple Frac-Notch Cutter is exceptionally efficient for fracture initiation in hard sandstone and limestone formations. Operating on electric wire line, it makes three separate notch cuts simultaneously on one run of the tool. Each notch cuts through casing and cement, and fractures up to 15 inches into surrounding formation. The three notches are cut on a horizontal plane at the same depth. A strong, solid segment of uncut casing is left between each notch. Uncut formation between notches is fractured by powerful action of improved cutting process. Thus, application of hydraulic fracturing pressure gives effect of full circle fracturing. Initial formation breakdown requires lower hydraulic fracturing pressure, and the formation usually takes a greater amount of propping material at a faster rate. Larger area of formation is fractured, making it possible to get up to 100 times more fracturing power in some formations. Cutter is available for use in 2, 2½, 3 and 3½-inch tubing and in casing sizes ranging from 4½-inch OD through 7-inch OD.

For more data on above item, circle E308 on postcard, Page 243

Super Casing Glass Jet Perforator Units carry 25 and 35 grams respectively and run in flexible Steel Strip Carriers to provide perforator diameters for use in 4-inch OD casing and larger. Shot densities are 1, 2, 3, or 4 holes per foot. Guns may be any length required to perforate single or multiple zones on one run in the well. Expendable Jet Perforator is relatively junk free. When it is fired, unit disintegrates into a harmless powder of silicon and lime. Steel Strip Carrier in which Glass Jet units are run into the well can be removed on electric cable after gun is fired. Perforators are recommended for best results in hard, medium hard and tight zones and after cement squeeze jobs. They have a pressure rating of 20,000 psi and temperature rating of 300°F. Air space enclosed within the charge absorbs a large part of the shock wave from firing.

For more data on above item, circle E309 on postcard, Page 243



Electric Isotope Injector determines fluid movement profiles and velocity readings in well bores. Defines producing zones, thief zones, water flooding for secondary recovery programs, and lost circulation problems. New method dispenses radioactivity directly from solid state into surrounding fluid. Radioisotope is "fixed" on surface of a metal "button." When not in actual use, activated "button" is removed and stored in protective containers. When ready to inject, "button" is placed in tool and lowered to appropriate elevation in well. Isotope is dispensed from "button" by energizing proper circuits of logging equipment from control panel in logging unit. Use of isotope in solid state is a major safety improvement. Not only has possibility of spillage been eliminated, but decontamination of equipment has been simplified. Cobalt 60, is standard isotope. It has half-life of 5.27 years and is readily removed from equipment and personal effects. When dispenser and associated tools are brought to surface, simply hose them off with good stream of water. The minute quantity dispensed in a well is soon dispersed and leaves no health hazard.

For more data on above item, circle E310 on postcard, Page 243

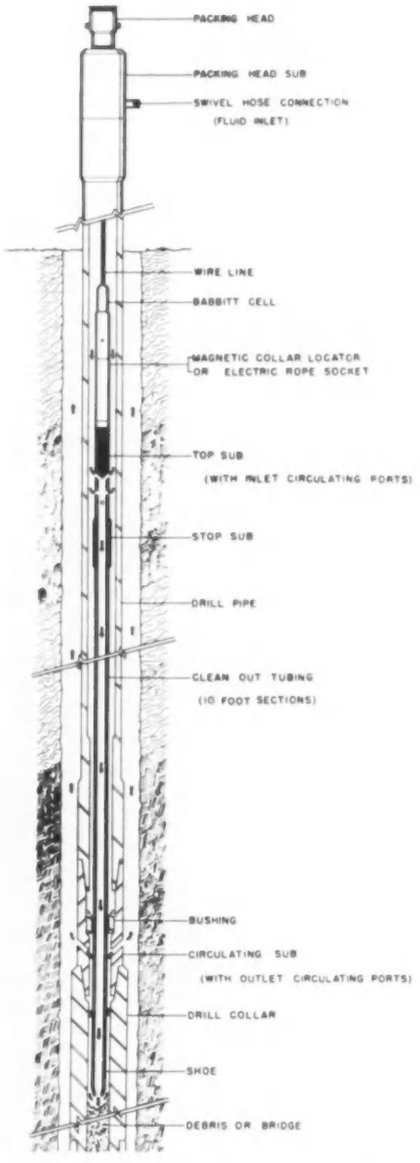
Neutron Log features include: higher counting rate; superior resolution; increased spacing which increases sphere of investigation and minimizes effect of invaded zone and well fluid; minimizes effects of chlorine. From original use primarily for correlation, Neutron Log usage has expanded to inter-well correlation, intra-well correlation, through casing correlations, porosity determination and gas location. Neutron curve records radiation which is artificially induced by a neutron source carried in the down-hole logging instrument. As a result of higher counting rate, an increased spacing of 23½-inches is possible without sacrificing quality of log. This minimizes the effect of invaded zone as sphere of investigation is increased. Wider spacing also tends to minimize effect of fluid within the well bore on the log.

For more data on above item, circle E311 on postcard, Page 243

Cement Locating Log determines cement tops and identifies cement columns in new or old wells. Also will indicate uncemented sections below the cement top and possibly detect channeling of cement column. Casing collar locations are recorded simultaneously. Log is not dependent on thermal change, does not have a time limitation, nor require use of a special additive. By recording a curve which reflects density of material behind the casing, the location of a cement column, when it differs in density from the displaced fluid, can accurately be determined. Log is usually run in conjunction with other nuclear well surveys, thus requiring no extra rig time. Also, it is economical when run in combi-

nation with other nuclear logs. It is a valuable aid for determining effectiveness of the primary cement job, checking squeeze jobs, and for future remedial or workover operations.

For more data on above item, circle E312 on postcard, Page 243

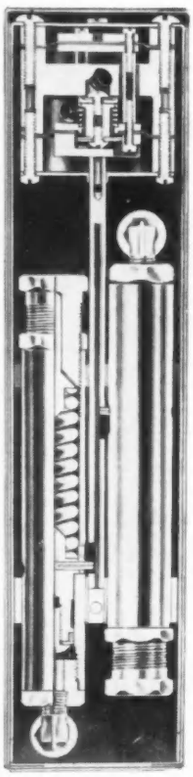


1¾-Inch Hydraulic Clean-Out Tool, for fishing out stuck drill pipe, drill collars and tubing, is run on electric wire line to clean out mud and formation bridges which have been plugged up while washing over, making it impossible to lower Magna-Tector and back-off shot to recover washed over section. Tool consists of a string of small flush joint washpipe made up of 1¾-inch OD x 10-foot alloy tube sections. A clean-out shoe is installed at bottom end of clean-out string and Magnetic Collar Locator and Electric Rope Socket at upper end. It is lowered through Packing Head Sub installed on top end of drill pipe or tubing to be used in fishing operation. Length of Clean-Out Tool string of washpipe should not exceed 300 feet. Assembly is then lowered through fishing string to top of fish. Circulating fluid from rig pumps is pumped down fishing string, enters top of Clean-Out Tool and emerges from bottom shoe in the form of a high velocity jet of fluid which washes debris out of fish as tool is lowered.

For more data on above item, circle E313 on postcard, Page 243

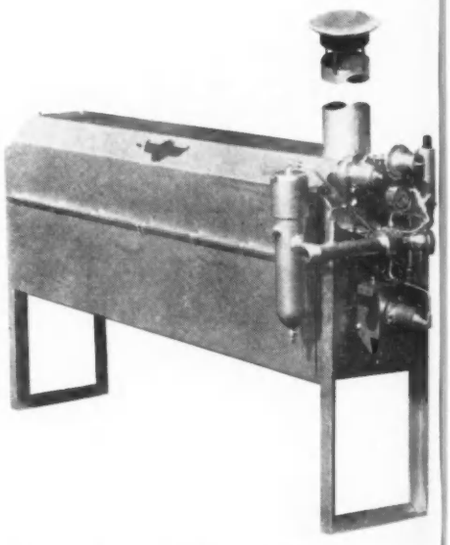
Merla Tool Corporation

Type E-1 High-Low Pressure Control Pilot has both high and low pressure sensing elements to allow pressure to be taken from two separate points. The E-1 is used as a pressure safety high-low shut-off and for well purger, back pressure and pressure reducer service. A range of 0-2,000 psi is available with four interchangeable pressure range springs. Control also features snap-action; pressure balanced diaphragms; resilient, large area, non-leak seat; non-bleed pilot; torque-free spring action; low friction piston seal and non-corrosive parts with over-range protection for pilot section. The 12 x 3¼ x3½-inch control is supplied in strong stainless steel case.



For more data on above item, circle E314 on postcard, Page 243

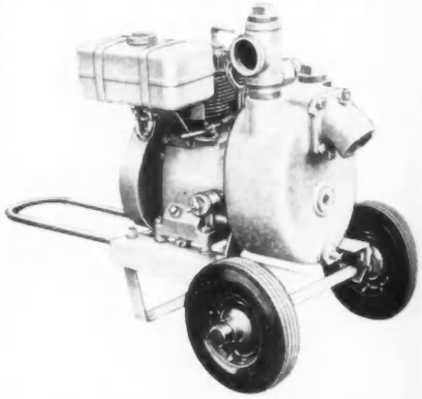
Type M-3 Gas Line Heater features indirect action. A burner heats bed of aluminum pellets which evenly radiate heat to heavy-wall steel gas circulation tubes. No water is used, eliminating damage through water boiling away and reducing corrosion. Maximum and minimum temperature controls are furnished as standard equipment, shutting off gas in event of a line leak, pilot failure or overheating. Two-stage pressure regulation takes burner gas from main line through



filter drip pot. A heavily insulated steel jacket aids in fuel economy. Heater capacity is 50,000 btu/hr. Working pressure is 1,500 psi at 700° F. Heater may be installed in any 2 x 5-foot level area.

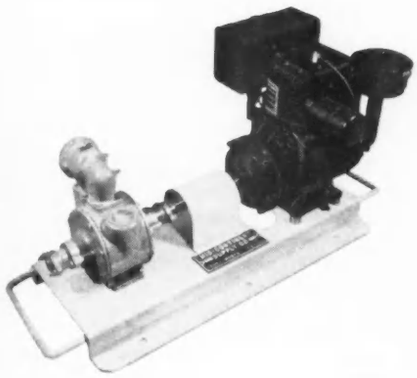
For more data on above item, circle E315 on postcard, Page 243

Mid-Continent Supply Company



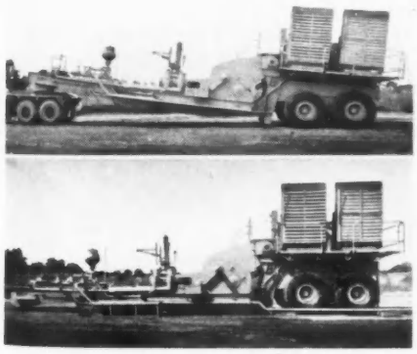
Mid-Continent Self-priming Centrifugal Pumps, available in capacity from 5,000 to 17,000 gallons per hour, feature compact, close coupled assembly of a high performance centrifugal pump and reliable, light weight gasoline engine. Unique design features self-cleaning and self-priming, both of which are highly advantageous in dewatering work. Impeller is thread-fitted on engine crankshaft which insures permanent alignment. Fewer moving parts and precision engineering assure long life and complete dependability. No special tools are required to dismantle. Briggs-Stratton 4-cycle engines power these units. This universally accepted engine has an outstanding reputation for economical and reliable operation, and is backed by standard engine warranty. Parts and service are readily available in the field.

For more data on above item, circle E316 on postcard, Page 243



Mid-Continent Circulating Units handle viscous materials up to 24,000 SSU. This simple rotary pump is rugged in construction and design to create maximum in efficiency. It can be used as a transfer pump, to circulate tank bottoms and for all general pumping needs. Users have found it will handle wide range of extremely viscous fluids and will pass a reasonable amount of scale and other debris. Its light weight enables easy portability. Component parts consist of Blackmer Pump powered by air-cooled, Briggs-Stratton Model 9-R6 and 19-R6 engines with all standard equipment. Absence of gears or high velocity impellers enables oil to pass through pump with minimum disturbances, and without whipping or churning up tighter emulsions.

For more data on above item, circle E317 on postcard, Page 243



Rock-Over Trailer is shown with two engines and two pumps. Unique design allows pump to operate with pump suction low, and with trailer frame (or master skid) resting on ground. Pump vibrations are dampened and need for jacks to take weight off tires is eliminated. When wench truck starts to load trailer, trailer frame will pivot or "Rock-Over" at a point just in front of bogie tires. As front end is raised, rear end goes down until tires support load. Further raising allows sufficient road clearance in front of tires. Design permits trailer-mounting of mud pumps complete with suction and discharge manifold and engines. Entire unit remains rigged up while moving from one location to another. Extended skid (or trailer frame) also provides working platform around fluid end of pumps. Since trailer frame rests on ground, forward end also makes ideal location for centrifugal pump. This design also makes ideal low-boy trailer for transporting heavy equipment which need not be carried in horizontal position. With frame on ground, it simplifies loading and unloading, particularly if equipment must crawl on and off trailer.

For more data on above item, circle E318 on postcard, Page 243

Mid-States Chemical Company, Inc.

Pay-Day Oil Well Cleaner is a granulated chemical compound specially formulated to dissolve paraffin and other refuse that stop or retard the flow of oil in producing wells. Paraffin-choked well is first filled with specified amount of water after which a pre-determined quantity of Pay-Day is dropped down annulus of casing. On contacting the water, it immediately begins to create a heat condition so intense that the oil and water actually boil. Even severest cases of paraffin accumulations, scale and other refuse are quickly dissolved. Pay-Day is equally effective on new wells and for dissolving paraffin in lead lines, flow lines and storage tanks. Packaged in 50-pound disposable containers, Cleaner is completely harmless to men and equipment when used as directed.

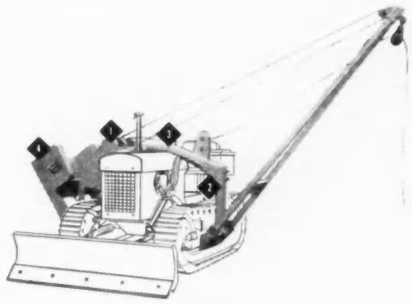
For more data on above item, circle E319 on postcard, Page 243

F-2 Sol-Treet is one of the most effective formulas ever developed for ridding wells of paraffin accumulations. By breaking-down molecules that cause paraffin, it is able to boost production substantially in slow-flowing wells. Typical user reports indicate that wells reduced to producing 3 to 5 barrels of oil a day, were upped to as much as 30 barrels per day after Sol-Treet was used to get rid of paraffin. Because it is so highly effective, less is required for each job. It is equally effective for dissolving paraffin in recycling, lead lines and for breaking-out and combating BS and paraffin in tank bottoms. Contains no halogens and is non-chlorinated. Safe to stock and handle—high flash point makes it virtually non-flammable.

For more data on above item, circle E320 on postcard, Page 243

Midwestern Mfg. Co., Inc.

Little Boomer Pipelayer features four important design changes which increase safety factors and lifting power: (1) New anti-reverse design for winch gears eliminates creepage and assures positive control. (2) Automatic boom travel stop which by-passes hydraulic fluid when boom reaches its upper limit, and prevents bending boom over the tractor. (3) Streamlined main frame which is stronger and more compact and is designed to fit each individual tractor model. (4) New design for counterweight castings and

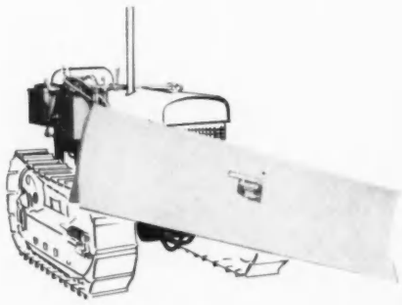


more effective positioning of the same to insure better balance and more lifting power. Counterweights are available from 100 pounds through 2000 pounds. Pipelayer also features exclusive double drum winch arrangement which places both winches side-by-side in full view of operator at all times. It is available for mounting on both crawler and wheel tractors.

For more data on above item, circle E321 on postcard, Page 243

Hydraulic Pipelayer for Caterpillar D4-C tractor features redesigned, simplified controls and counterweights and is designed to give a lifting capacity of 17,500 pounds. All controls of new #4-C pipelayer are full hydraulic.

For more data on above item, circle E322 on postcard, Page 243



Hydraulic Angle, hydraulic tilt angle backfill blade for Oliver OC-4; Case Models 310, 420, 520; and International

T3-40 tractors is fully hydraulic and all angling and tilting mechanisms are compactly arranged and fully protected. Company also offers manual angle and tilt blades with any combination of hydraulic angle and tilt. Blades may be mounted with Midwestern Sideboom or separately.

For more data on above item, circle E323 on postcard, Page 243

Miller Sand Pump Company

"Slim Hole" Sand Pump with 2-inch OD is designed for use in 2⅞-inch slim hole completions. Lengths for the sand pump are from 20 to 24 feet and it is designed like larger Miller sand pumps, is accurately machined with a lug-type bottom. Other Miller sand pump sizes are: OD 2½, 3, 3⅓, 4¼, 5, 5½ and 7 inches. Lengths are 20, 25 and 30 feet for 3-inch OD and larger pumps. The 2½-inch size comes in 20 and 25-foot lengths.

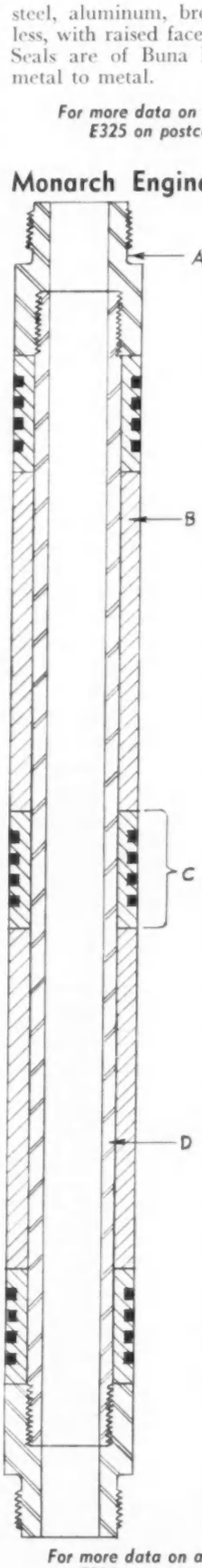
For more data on above item, circle E324 on postcard, Page 243

Mission Valve and Pump Co.

Duo-Chek Check Valve fits between flanges to permit savings in weight, installation time, cost, and inventory. Available in sizes from 2 to 48 inches and Series 150 to 2500, it weighs from 2 to 10 per cent as much as conventional swing check valve. It requires, depending on size, from four to 50 percent as much space. In sizes 2 and 3 inches, one valve fits Series 150, 300 and 600. In sizes 4 to 12 inches, one valve fits between Series 150 and 300 flanges. Design is simple, yet strong. Only six parts are contained within body, and without use of internal fasteners or joints. All parts are full floating. There is no load on shaft. Molded seal ring, bonded directly into a groove in each plate provides absolute shut-off. Seal, used with the stainless steel return spring, is effective even at zero pressure differential across the valve. Valves are available in steel, aluminum, bronze and 316 Stainless, with raised face or ring joint flange. Seals are of Buna N, Teflon, Viton or metal to metal.

For more data on above item, circle E325 on postcard, Page 243

Monarch Engineering Corp.



Oil-Well Pump Plunger (Piston-Ring Type) provides inexpensive, positive-seal, metal-to-metal pump for normal pumping conditions when extreme sand is not a factor. Best results have been obtained in relatively high-gravity fluid, and most comparative runs have been against cup type or fabric-ring type plungers. Rings are made of alloyed cast iron. The maker recommends plunger to be run in any type of precision-honed steel barrel, regular, hardened, or chromium-plates. The 12-ring plunger is recommended for wells to 3,000 feet pump depth, and 16-ring plunger for deeper wells. The piston-ring plunger has standard API pin-end threads. Worn plungers are renewed by changing carrier and piston-ring assembly. Accurately machined plunger tube, spacers, and carriers allow fast assembly, with no alignment tools required.

For more data on above item, circle E326 on postcard, Page 243

Mobile Drilling, Inc.

Pitcher Rotary Sampler recovers accurate samples from problem clays, soft rock, and friable shales. Drilling fluid cannot erode or contaminate sample even in soft overburden or water-sensitive formations. A spring-seated shelby tube telescopes into the outer barrel, as cutters bore harder formations, to eliminate excessive pressures and prevent tube damage. Sampler requires no presetting or surface control. The drill can be stopped, and rod rechucked or even raised slightly, without breaking the core. Separate reaming operations to obtain samples from greater depths are not needed.

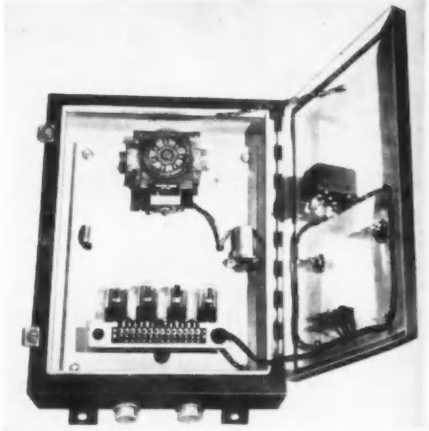
For more data on above item, circle E327 on postcard, Page 243

Montello, Inc.

Phenol-seal is a thermo-setting laminated plastic lost-circulation material of extremely high compressive strength (35,000 psi). Offered in five grades—fine, course-fine, medium, course, and super—it is milled in flat particles and has no "wedging" or "fracturing" effect on pumps and valves. Chemically inert, it does not react to extreme temperature changes, acids or alkalies. The material reduces friction, mixes with all known muds, will not change mud properties nor "settle out." Product is non-fluorescing and cannot confuse core analysis. In recent 6-well test, Pheno-Seal reduced down time from an average of nine days per well to less than one day. Mud cost per foot was reduced from $5.42 average on first three wells to $3.11.

For more data on above item, circle E328 on postcard, Page 243

Frank W. Murphy Mfg., Inc.

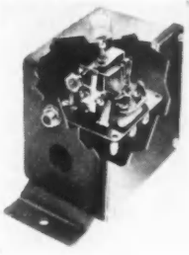


Automatic Engine Controller with battery powered program timer, automatically starts and stops internal combustion engine on unlimited, predetermined schedule. Program timer enables you to operate engine on automatic schedule for any pre-set number of minutes or hours on any predetermined days. Can also be activated by predetermined line pressure, temperature, tank level, radio signal, relay contact, or manually. Entirely con-

structed of standard, readily available components to simplify maintenence or repair on the spot. If engine is equipped with safety switch-gages it can sound or flash alarm or activate remote control panel in event of malfunction of engine. Available for 110 Volt AC or 6-12-24 Volt DC. DC model is equipped with DC motor with special cam to operate starting cycle. Starter is energized for approximately 10 seconds and de-energized for same period and continues cycle until engine starts. Cycle timer and starter are de-energized as soon as engine vacuum builds up to selected adjustment. Equipment is housed in weather-proof, gasketed enclosure 11 x 9 x 5 inches. Controller with program timer also available for electric motors.

For more data on above item, circle E329 on postcard, Page 243

VS-1 Vibration and Shock Safety Switch is sensitive to abnormal oscillation in two planes of motion. Adaptable to various mounting locations and methods. Recommended for use on engines, pumps, pumping units, compressors or any other equipment subject to destructive motion. Models available for grounding ignition, sounding alarm, activating control panel lights, or operating valves such as diesel fuel shut-off valves, and electric motor controller circuits. Rated at 5 amps, 110 volts AC



For more data on above item, circle E330 on postcard, Page 243

The National Supply Company

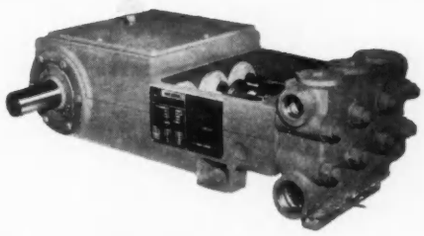
Type "K" Tubing Head was developed as an economical tubing head for medium and shallow wells, where completion and production methods do not require a more complex assembly. It has a "full opening" bore and is available with female casing connections of 5½ inches and smaller. Type "K" also can be provided with a 7-inch male casing connection, which has a 5⅛-inch body-through bore. Optional thread or slip suspensions for 2⅜-inch or 2⅞-inch outside diameter tubing is obtained with interchangeable mandrel hangers and slip packing units. Slip packing unit is identical to that used in the Type "E" Tubing Head. Standard accessories include elements to permit use of Type "E" Stripper with Type "K" Tubing Head.

For more data on above item, circle E331 on postcard, Page 243

National 200 Rig, for depths to 8,000 feet, and National 300-B Rig, for depths to 12,000 feet, are new self-propelled service and workover rigs. With both models, the rig is mounted on a specially-designed truck. Power for both rig and truck is provided by a single engine power unit through an Allison torque converter and Allison transmission. Nominal power range of 150 to 200 horsepower for Model 200, and 250 to 300 horsepower for Model 300-B. Choice is available between a folding or a telescoping mast, either of which can be raised in approximately two minutes. Folding outrigggers with a spread of 16 feet between centers make ground guys unnecessary. Racking platform will accommodate 10,080 feet of 2⅞-inch OD tubing. Both drawworks are of double-drum type with steel plate box-type frame construction.

For more data on above item, circle E332 on postcard, Page 243

J-50 Triplex Pump, 50 input horsepower, 3-inch stroke plunger pump, is for water flooding, salt water disposal, power oil service, and other purposes. Capacity range for low and medium pressure models with 11 plunger sizes is 4,720 barrels per day at 560 psi to 742 barrels per day at 3,565 psi. More than 5,000 psi is provided by Power Oil Model. Features include (1) integral suction pulsation dampener, (2) intermediate rods with stuffing box lubrication

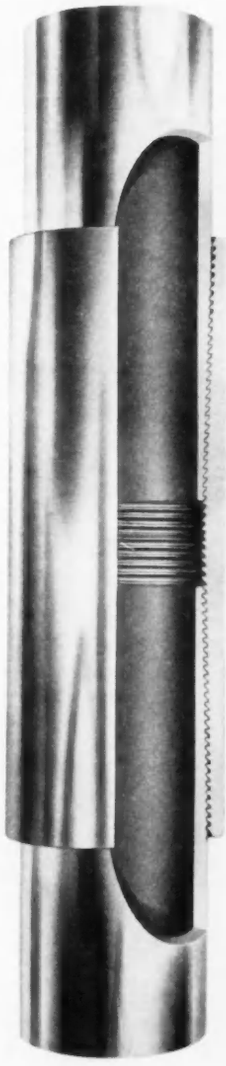


and easy replaceability without disturbing crosshead or plunger stuffing box, (3) plungers and stuffing boxes that are removable without disturbing fluid cylinder, (4) valves that are easily removable without disturbing stuffing boxes, (5) aluminum connecting rods for low inertial loads, (6) double extension crankshaft. The pulsation dampener extends full length of the fluid end below and close to suction valves for maximum efficiency. Valves have shouldered and tapered body for easy removal.

For more data on above item, circle E333 on postcard, Page 243

National Tube Division, United States Steel Corp.

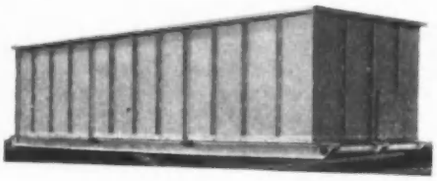
USS National Buttress-Thread Tubing provides a joint with tensile strength comparable to that of the body of the tubing, with maximum clearance for multiple completions. It has no external or internal upset; no cold working swaging, expanding, etc. on pipe ends. (Therefore has extended life in service because it can be easily repaired in the field.) Contour of coupling ends, square or beveled, provides minimum interference when running. Electro tin plating (.0020" Avg.) on coupling threads assures gas-leak tightness and reduces make-up torque and tonging. Rugged flat-crested buttress thread is highly resistant to joint damage. The joint permits repeated make-ups and breaks without galling. Flat crests and roots, parallel to the pipe axis, give good stabbing characteristics. They also provide fast make-up and reduce cross-



threading, giving maximum running speed. Tubing is available in sizes 2-inch through 4½-inch and in J, N and P grades.

For more data on above item, circle E334 on postcard, Page 243

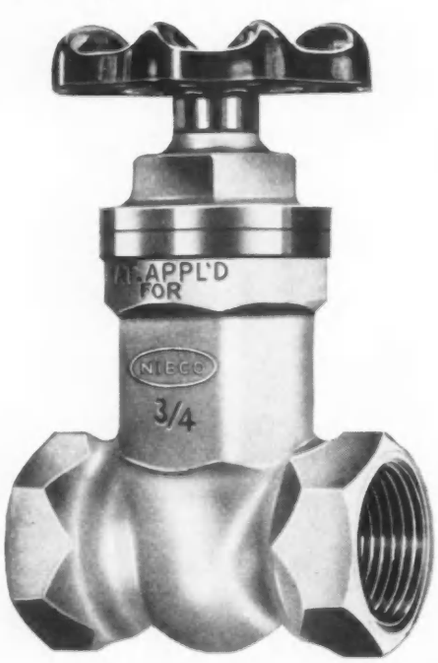
Niagara Screens and Plant, Ltd.



Niagara Mud Suction Tank is 26 feet long x 8 feet wide x 6 feet deep, fabricated in 3/16-inch thick mild steel plate of all-bolted construction. It is mounted on three-member type skids fabricated from 8-inch x 6-inch R.S.J.'s with 5-inch bore tubes at ends. The tank plates are galvanized, skids are painted. Unit is supplied in sections for ease of transportation. Tanks are of rugged construction and can be of standard design or built to clients' requirements. Tanks may be bolted or welded and finished either black or galvanized. In addition, Niagara Designs and manufactures all Ancillary Equipment including Walkways, Mud Ditches, Staging, Stillages and Stairways.

For more data on above item, circle E335 on postcard, Page 243

NIBCO, Inc.



Husky Gate Valves can be used for throttling like a globe. Uses include water, oil, gas. Made of 85-5-5-5 Red brass. Valve has temperature range in continuous operation of minus 40° F. to 250° F. Can be used with 15 pounds saturated steam.

For more data on above item, circle E336 on postcard, Page 243

Nitrogen Oil Well Service Company

Nitrogen Oil Well Service Company (formerly Big Three Welding Equipment Company, Nitrogen Service Division), offers such specialized services as transportation of liquid nitrogen to the well site and, with a high pressure evaporator, transforming the liquid back to the gaseous phase. The inert gas, available on a single unit in quantities up to 175,000 standard cubic feet and 6,000 psi, is used for various types of displacements, corrosion inhibitive squeezes, paraffin cleaning treatments, blowout preventor testing and surfactant treatments. The newest developments include acidizing and fracking with high pressure gas. Perforating with a nitrogen back pressure and jet perforating, using nitrogen as a carrying agent, are two other devolopments.

For more data on above item, circle E337 on postcard, Page 243

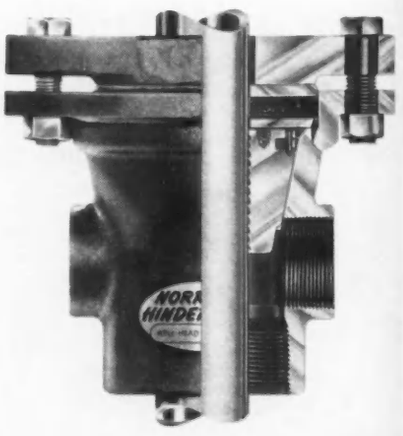
W. C. Norris Division, Dover Corporation

Butterfly Valve, Lug Type

Norriseal Wafer Type Butterfly Valve, for working pressures to 150 psi, is now available with aluminum, aluminum-bronze, and ductile iron bodies. The aluminum and aluminum-bronze bodies with double rib type (tangency) design were developed to prevent collapsing of flanges. They are readily adaptable to all types of automatic operators. The ductile iron bodies have lug type design. They may be drilled or tapped as specified. New bodies are in addition to standard single rib type cast iron body and are available in sizes 2-inch through 12-inch.

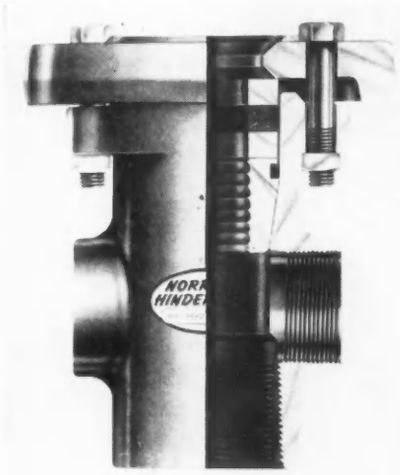
Butterfly Valve, Rib Type

For more data on above item, circle E338 on postcard, Page 243



Type WS Tubing Head is a new, economical head designed for use in water floods and in areas where lower pressures are encountered. It utilizes slip suspension and will suspend 5,000 feet of 2-inch or 2½-inch upset tubing. The head may be used with a stripper adapter for servicing by removing top gland and bolting adapter to body flange. Available with either a 4½-inch or 5½-inch female bottom thread, Tubing Head is rated at 1,000 psi test and 500 psi working pressures.

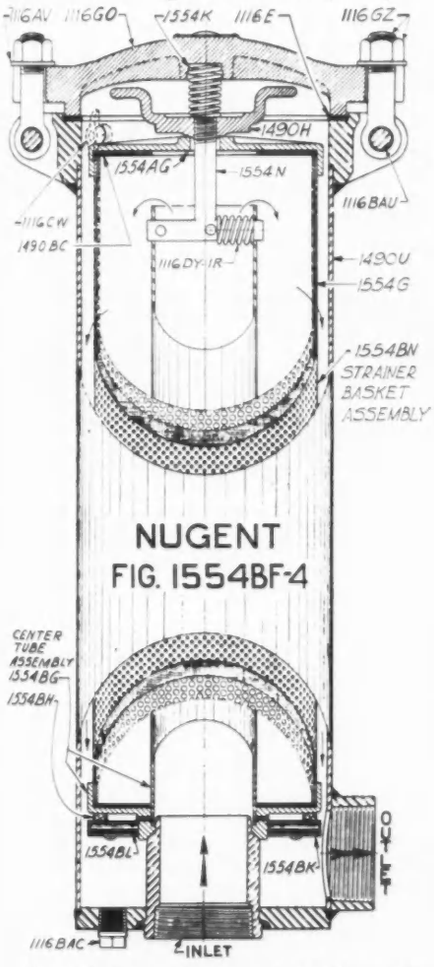
For more data on above item, circle E339 on postacrd, Page 243



Type SL Tubing Head is a low-cost slim hole tubing head designed for use in slim hole completions. It is available with a 2½-inch EUE 8 Rd. female bottom thread. The head will suspend ¾, 1, or 1¼-inch upset or non-upset tubing, or 1½-inch non-upset tubing with either mandrel or slip suspension. It is rated at 1,000 psi test and 500 psi working pressures. A top cap provides convenient base for a tubing spider.

For more data on above item, circle E340 on postcard, Page 243

Wm. W. Nugent & Co. (Inc.)



Combination Strainer and Magnetic Separator to protect bearings of engines, pumps, compressors and other valuable machinery, offers added protection of magnetic separation. Capacities: 1 to 3,900 gallons per minute of oil. Special designed Alnico Magnets establish a magnetic field through which the strained liquid must pass as a final stage before leaving unit. Thus, minute ferrous particles are trapped and removed from fluid strained.

For more data on above item, circle E341 on postcard, Page 243

Oil Base, Inc.

Special Additive 47 is a non-corrosive oil soluble liquid which may be added to an oil base drilling fluid system to prevent or correct undesirable properties which can result from contamination with water or water base muds. Such contamination normally results in increased viscosity and gel strength, and weight material may tend to become water wet. New product is designed to restore drilling fluid to its original properties prior to contamination. Addition of one to six pounds of Additive 47 per barrel of contaminated oil base mud has proved to be effective in the field in dispersing solid particles, thinning out any heavy concentrate, maintaining correct viscosity and gel strength, and keeping the weight material oil wet.

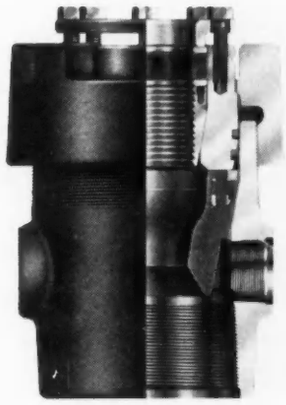
For more data on above item, circle E342 on postcard, Page 243

Oil Center Tool Company

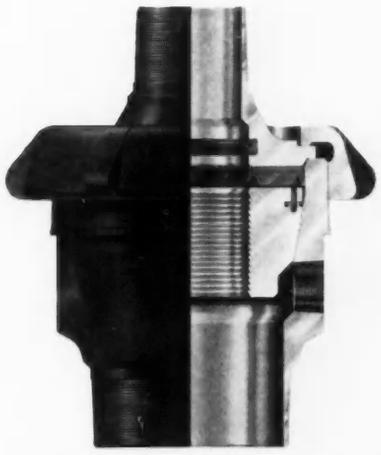
O-C-T Screwed Flow Control is designed to reduce cost, weight, size, and to eliminate need for screwed tee, bull plug, nipples, valves, and choke. Control combines all parts necessary to perform functions of a single-wing tree in a simple, one-piece casting. It can be screwed directly to the top of a screwed master valve. It is trouble-free in operation and easy to maintain. The wing valve gate and seat may be replaced in only five minutes. Both gate and seat are hard faced to resist erosion.

For more data on above item, circle E343 on postcard, Page 243

TH Series Independent (Low Pressure) Tubing Heads use forged steel bodies available for 4½-inch through 7-inch casing. Various hanger and stripper combinations are interchangeable, giving line its flexibility. They allow use of slips (TH), slips and stripper (THS), a threaded hanger (THA), or a threaded hanger and a stripper (THSA). All TH Tubing Heads have standard API 8⅝-inch, 8 RF casing threads as their top thread. Thus, a standard API companion flange can be used to attach blowout preventers. If an operator should want to use both a stripper and a blowout preventer, a blowout preventer adapter flange with lockdown screws to hold down the stripper and bowl is available. TH Tubing Heads are available with flanged bottoms.



For more data on above item, circle E344 on postcard, Page 243

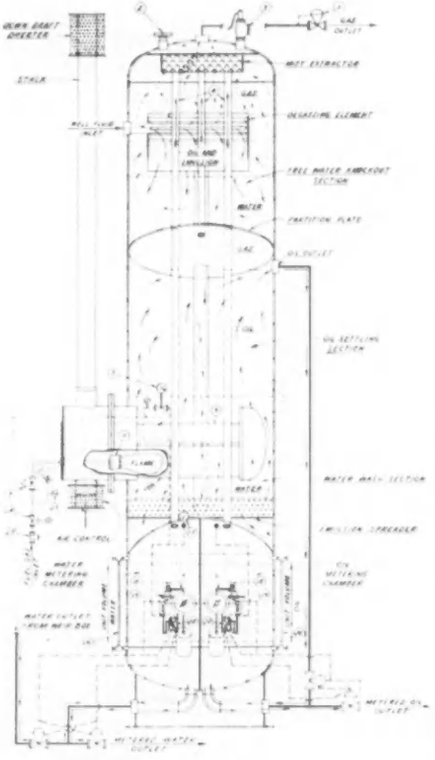


CM Series Casing Head features wrap-around slips for suspending the casing and a simple, reliable, lip-type seal between strings. Seal requires no compression. All sizes of CM casing heads are full opening to allow drill bits or centralizers to pass. Casing heads in series are CM and CMT. Both use forged steel bodies and are identical except CMT casing head is equipped with male-threaded adapter. Adapter has secondary pack-off that seals around inner casing and confines pressure to minimum area. Bottom connection of CM head is male-threaded so it can be screwed directly into casing collars. Top connection is threaded with standard API 8RF casing thread and uses a simple nut instead of heavier, more expensive flange, with the necessary studs and nuts. Standard outlet size is 2-inch, but 2½-inch and 3-inch outlets are also available. To facilitate use of blowout preventers, a standard

API companion flange may be used. Flange is removed when preventers are removed and can be re-used on subsequent wells.

For more data on above item, circle E345 on postcard, Page 243

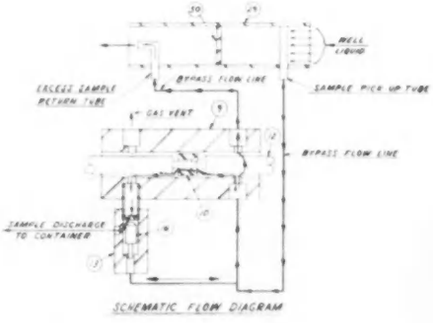
Oil Metering and Processing Equipment Corp.



Metrol Metering Treaters incorporate the functions of separating gas and liquids, efficient treating of emulsion, and accurate measurement of oil and water in two integral metering compartments in lower portion of vessel. Free water removal in the upper separating chamber is an optional feature. Oil-water interface control is maintained by a weir or by float operated pilot and valve. Treaters are equipped with high capacity heating tubes that eliminate "hot-spots" and thus prevent fire tube failures. Also, units are equipped with trouble-free and safe combustion control equipment to prevent "blow-outs" and "flash-back." Emulsions in most areas can be treated without excelsior. However, excelsior can be furnished in case it is needed. Available in 3, 4, 6, 8 and 10-foot diameters by 20-foot shell length, and in working pressures of 25, 50, and 100 psi.

For more data on above item, circle E346 on postcard, Page 243

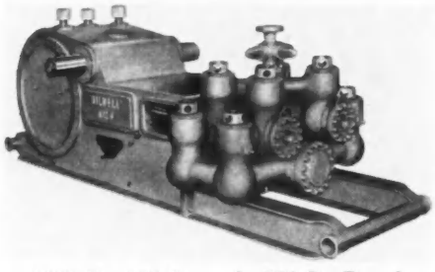
Metrol RP BS&W Samplers provide high sampling accuracy by use of sample nipple and pump designed specially for



sampling. Sample nipple contains restrictive orifice and pick-up tube. The pick-up tube utilized in sample nipple is perforated to provide selective sampling so that by-pass flow is representative of liquid flowing through sample nipple. Flow through orifice in sample nipple creates differential pressure which provides by-pass flow through sampler pump. A portion of by-pass flow through pump is removed and discharged into sample container for later BS&W determination by centrifuge. Surplus liquid passes on through pump and re-enters sample nipple downstream of restrictive orifice. A special pressure balanced check valve dependably controls back flow of liquid on the suction stroke of the pump. Sample rates of ½ pint to 10 gallons per 24 hours are available. Sample rates are independent of rate of flow through pick-up tube. Sampler is available in working pressures up to 3,000 psi.

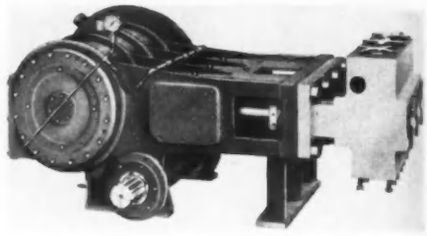
For more data on above item, circle E347 on postcard, Page 243

Oil Well Supply Division United States Steel Corporation



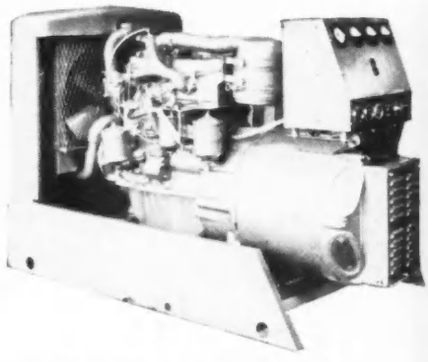
1000-P, 850-P and 700-P Duplex Power Pumps are designed for heavy-duty drilling service. Each pump has fabricated steel power frame that reduces weight-to-horsepower ratio over earlier models. Two-piece construction allows separate handling of fluid end when necessary. Double extension of input shaft permits left-hand, right-hand, or twin drive. High-pressure fluid end is a one-piece steel casting with spherical-passage intersections for low stress. Walls are correctly proportioned to withstand highest working pressures to give dependable service necessary in deep drilling. Refinements such as accessible screw-type stuffing box glands and heavy-duty liner retention system simplify installation and maintenance of fluid-end parts. 1000-P has 18-inch stroke length and is rated 1,000 input horsepower at 65 rpm. 16-inch stroke 850-P has rating of 850 input horsepower at 65 rpm. 700-P power pump is rated at 700 horsepower input with crankshaft turning at 65 rpm and has a 16-inch stroke length. All three pumps accommodate 7¾-inch maximum liner diameter.

For more data on above item, circle E348 on postcard, Page 243



Super 48 Triplex High-Pressure Plunger Pump is designed for providing extra depth capability for slim-hole drilling. This pump has extremely rugged power end. Crankshaft is mounted in four heavy-duty roller bearings. Bearings are supported by heavy steel rings fabricated into frame. Large multi-strand roller chain transmits power from input shaft to crankshaft. All reciprocating parts have extra strength for loads imposed by modern deep well circulating requirements. Super 48 is outstanding for use singly or in multiples to obtain mud volume required from top to bottom of hole with no change in plunger size. Its short over-all length and light weight make this compact pump well-suited for truck mounting.

For more data on above item, circle E349 on postcard, Page 243



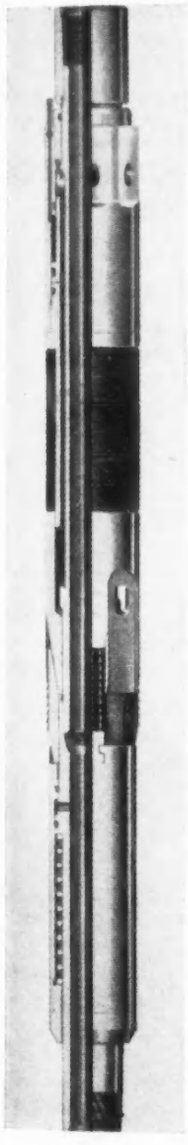
D. W. Onan & Sons, Inc.

Series DZC 25KW Diesel Electric Generating Plant is completely self-contained, with its water-cooled diesel engine, Onan "Magneciter" generator and Onan controls assembled into one compact unit to provide smooth-running, full-rated 25KW for both primary and emergency standby applications. Prime power unit provides dependable continuous source of electricity in emergency power applications, where low-volatile diesel fuel is preferred over gasoline. Prime mover is heavy-duty, 4-cylinder, 60 horsepower (at 1,800 rpm) Hercules DD-226 diesel engine. Generator is new "Magneciter" type and will

provide stepped-up performance in both primary and standby applications by: (1) Faster voltage recovery. (2) Less voltage fluctuation. (3) Greater reliability; all moving parts in exciter and voltage regulator are eliminated. (4) Fewer adjustments and easier servicing. Generating plants are rated at 25 KW, 31.25 KVA at 0.8 Power Factor and are available in all standard voltages to 460 volts.

For more data on above item, circle E350 on postcard, Page 243

Page Oil Tools, Inc.



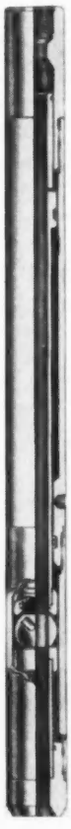
Page AVA Surface Controlled Annulus Valve is designed for emergency shutoff on dual completions where casing annulus is used as a flow conductor. Tool is installed in tubing string about 200 feet below well head, with ⅛-inch tubing extending to surface for pressuring valve open. Slips on tool are set by pressuring tubing string at the surface, and then packer element can be appropriately loaded. Generous annular flow area is provided inside packer and piston. Annular piston has equal areas, with outside exposed to surface controlled pressure and inside exposed to flowing pressure. When emergency arises, pressure is vented through various selective means, and well pressure closes the valve. Closing spring is available for low pressure wells.

For more data on above item, circle E351 on postcard, Page 243

Otis Engineering Corporation

Type F Slim Hole Bridge Plug is designed to be run on a wireline and landed in any collar recess in the casing. Bridge plug is made of drillable materials which can be drilled up rapidly or dissolved chemically if necessary. Once set, cement or other plugging materials may then be dumped on top of the plug through use of new Otis mechanically operated, positive displacement dump bailer. Available in all slim hole casing sizes, this new bridge plug is extremely economical, safe and simple to install and may be run in and landed under pressure by standard wireline methods.

For more data on above item, circle E352 on postcard, Page 243

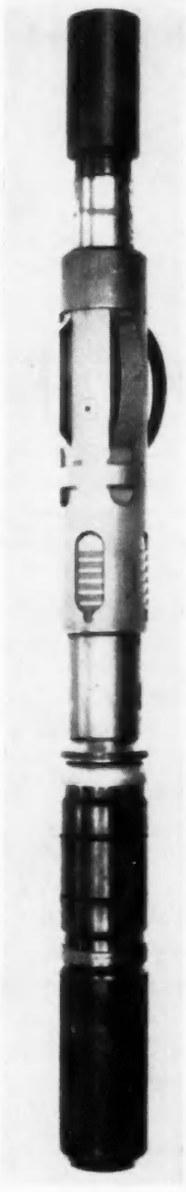


Type H Pressure-Operated Tubing Safety Valve is a pressure-operated, ball-type valve designed to automatically shut in a well in the event the well should flow at a greater volume than anticipated. The ball is held in open position by pressure from within the valve's pressure chamber. When well pressure drops below valve's pressure chamber setting, the seat automatically moves upward to cause the ball to rotate to closed position and trap formation pressure. The valve operates independent of the volume of flow. The valve may be reopened after operation by wireline methods or by injecting pressure at the well head. Valve is designed to be run and set in an Otis nipple made up in the tubing, or on a slip-type mandrel at any depth in the tubing. Valve may be used in wells with a sand problem since the full ¾-inch bore of the ball and seat allows a through-conduit flow course.

For more data on above item, circle E353 on postcard, Page 243

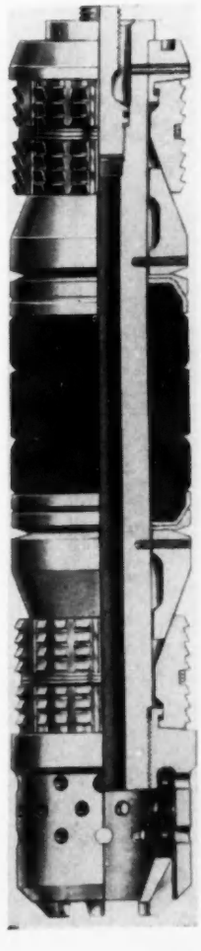
Type J Otis Tubing Safety Valve is designed to automatically shut in a well in the event the well should begin flowing at a volume greater than anticipated due to failure of surface equipment. It offers several distinct advantages when installed in wells producing sand laden fluids or gases. Safety Valve is a subsurface, ball-type control valve which utilizes a flow bean and spring in much the same manner as the Type F Otis Safety Valve or "storm choke" and at the same time offers advantages of ball and seat type of closure. The differential across the flow bean is taken above the ball and seat which acts to eliminate turbulent action within the valve mechanism. The ball is designed to rotate to closed position when differential created by flow through the valve forces the bean to move upward. Being a ball and seat type valve, the valve's mechanism is not adversely affected by sand and therefore may be installed in wells where sand is a problem.

For more data on above item, circle E354 on postcard, Page 243



Type RB Retrievable Slim Hole Packer is now available in 2⅞-inch size. Packer is designed to be run on tubing into a cased hole to isolate a section to be treated or produced. It may be run and set in tension as an upside-down hook wall packer or as a conventional hook wall packer and set in compression. Rated to 7,000 psi at 300° F., this new retrievable slim hole packer is full opening to permit passage of wireline tools, bottom hole pressure bombs, etc. and has tubing thread at either end to permit attaching a tail pipe if desired.

For more data on above item, circle E355 on postcard, Page 243



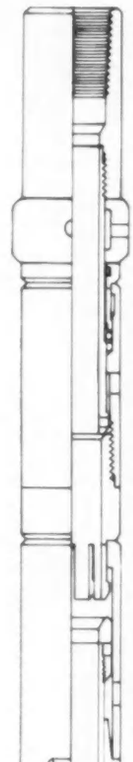
Type BC Bridge Plug has been reengineered and is now available in slim hole sizes. This dependable slim hole casing bridge plug is made of drillable materials and designed to be used as a positive plug to prevent movement of fluid or gas in either direction, or to plug and abandon. Bridge plug is short and compact, which means there is less to be drilled up when plug is removed. Upper and lower slips are designed to prevent movement of plug

in either direction. It has a small OD for easy running, a junk pusher incorporated into the plug and is being manufactured in 2⅞-inch through 7-inch sizes. Available through major logging and perforating companies.

For more data on above item, circle E356 on postcard, Page 243

Drill Pipe Logging System, designed to produce accurate electric logs in an entirely new way, practically eliminates rig downtime for logging. This system permits a log to be obtained while drill pipe is pulled out of the well. A self contained instrument is pumped down the drill pipe prior to logging. An electrode attached to the instrument projects through the bit to log the open hole. No lines or cables are used between instrument and surface. The log is recorded on magnetic tape within the instrument as drill pipe is raised. Features of this new tool are: (1) self potential 16-inch and 64-inch normal resistivity curves may be obtained when coming out of the hole to change bits; (2) no change in rotary drilling procedure is rerequired; (3) logs may be obtained with each bit change or sooner.

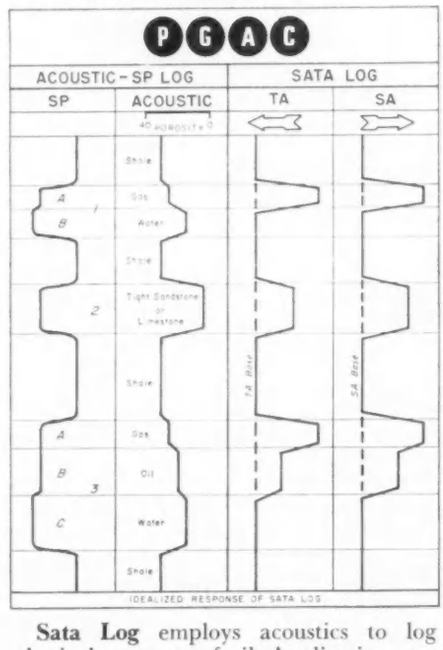
For more data on above item, circle E357 on postcard, Page 243



Type G Pack-Off Assembly and Type D Collar Stop is designed to be used to straddle and pack-off holes in tubing and thereby permit continued production of the well without pulling the tubing. This new pack-off assembly may be run or pulled under pressure by wireline methods and offers a straight through, full opening bore to permit pressure bombs, paraffin scrapers, etc. to be run through the pack-off. Pack-Off Assembly is designed to be run in and landed on newly developed Collar Stop and is expanded and held expanded by mechanical means. Once set, pressure from above or below pack-off acts to further expand the self-energized packoff element and provide a positive seal. Both Collar Stop, and Pack-Off Assembly are full opening and present minimum restriction to flow.

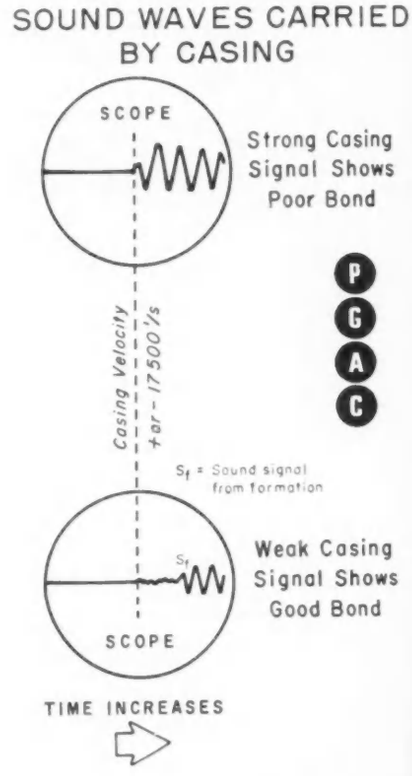
For more data on above item, circle E358 on postcard, Page 243

Pan Geo Atlas Corporation



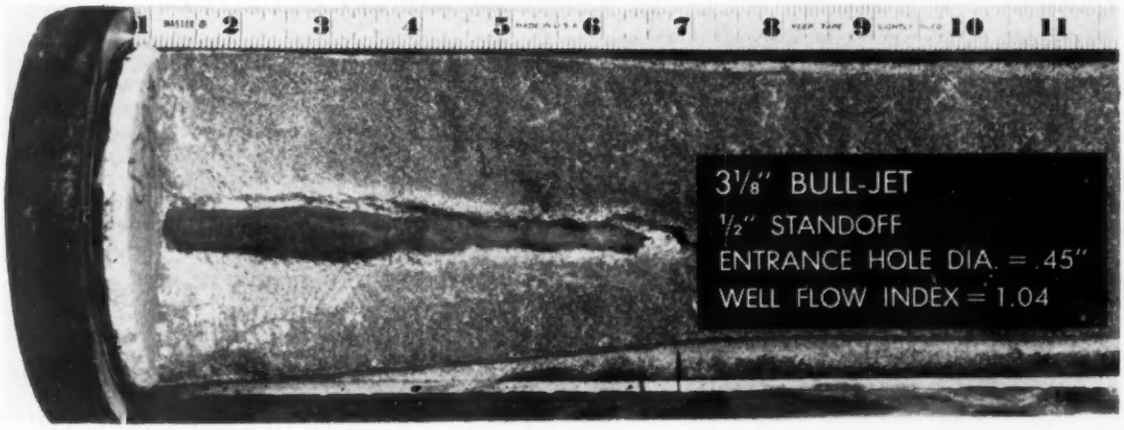
Sata Log employs acoustics to log physical property of oil. Applications are particularly good in fresh water sands and in reservoirs which contain enough shale and salt water to cause low resistivity readings on electrical logs. Idealized response of Sata Log is illustrated. Log exhibits two curves, one of which is attenuation of the acoustic signal (SA) between two receivers; the other is the transmission amplitude (TA) of acoustic energy at the first receiver. Distinct acoustic properties of hydrocarbons enable log to distinguish between gas, oil, and water on a qualitative basis in both high and low porosity media. PGAC makes no quantitative claims at this time for new Sata Log technique.

For more data on above item, circle E359 on postcard, Page 243



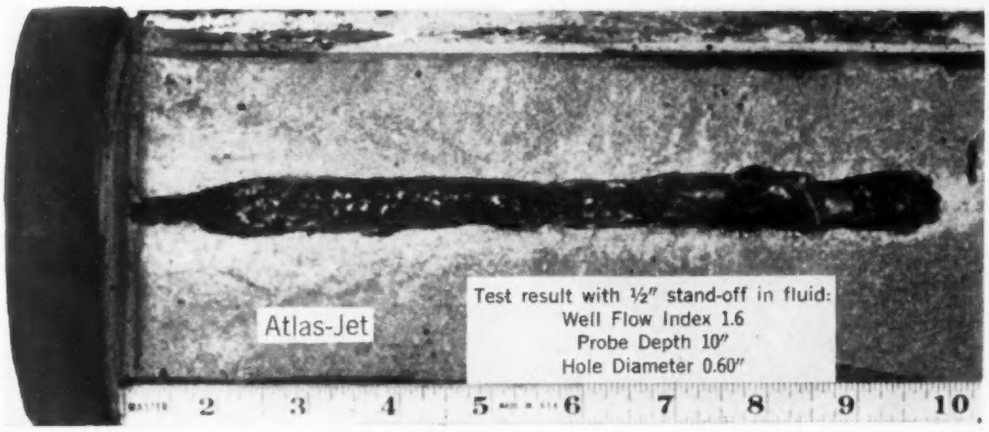
Sata Cement Log is one of the most exciting advances made in oil well logging in a number of years. With new log, it is possible to locate top of the cement behind the casing. Quality of cement bonding to the casing, as well as to the formation, is also determined. Sound wave amplitude recordings enable strength of sound energy carried by casing to be studied. When casing is tightly cemented, sound is dampened and the log records a weak signal. If casing is not cemented, sound is carried at a much higher amplitude level. Illustration shows oscillograms of sound waves carried by casing as seen in logging unit. Cement Logs have pointed the way to successful re-working of older wells.

For more data on above item, circle E360 on postcard, Page 243



3⅛-inch Bull-Jet Charge for perforating in well completions with 4-inch and 4½-inch liners using 3⅛-inch OD steel case retrievable guns, was test-fired in a standard flow lab under 1,500 psi at 180° F., with clearances of ½, 1, and 2 inches. Tests were conducted with targets and lab flow data complying with proposed API standards for perforator evaluation. Targets were 15-inch deep Berea sandstone cores behind a ⅜-inch thick steel faceplate and ¾-inch hydromite. Under standard conditions of ½-inch clearance, Bull-Jet penetrated 7 inches deep with an entrance hole diameter of .45-inch, and Well Flow Index was 1.04 as shown in photo. Bull-Jet 3⅛-inch shaped charge is small-sized version of Atlas-Jet charged for 4-inch and 5-inch casing guns.

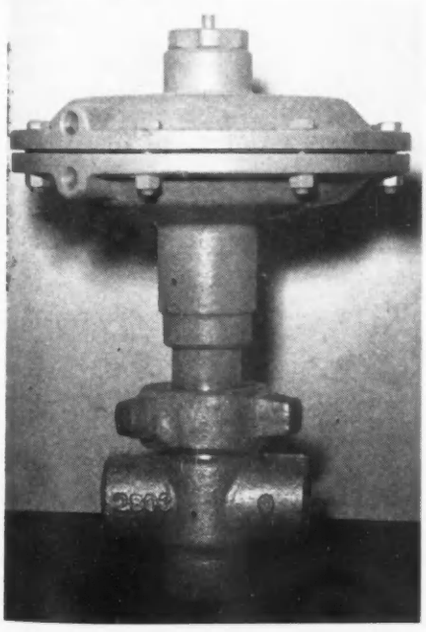
For more data on above item, circle E361 on postcard, Page 243



Atlas-Jet Charge for perforated well completions, is available in PGAC's 4-inch and 5-inch OD hollow-carrier retrievable guns. For evaluation, Atlas-Jet charges were fired in standard flow lab under subsurface conditions of 1,500 psi at 180° F. into targets with ⅜-inch steel faceplates, ¾-inch Hydromite, and 15-inch deep Berea sandstone cores. Tests were made at clearance of 0, ½, 1, and 2 inches. Well Flow Index for all tests varied from 1.5 to 1.7; penetrations were from 9¼ inches to over 10 inches. Photo shows results of a representative shot at ½-inch clearance. Tests were conducted with all targets and lab flow data complying with proposed API standards for perforator evaluation.

For more data on above item, circle E362 on postcard, Page 243

Parquip, Inc.

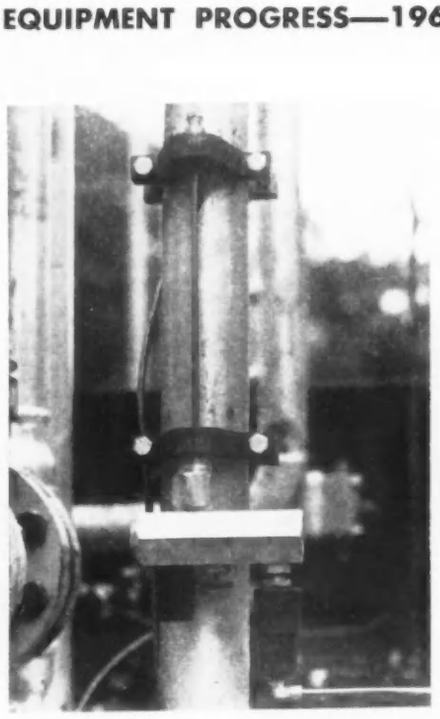


P-3801-SE 3,000 PSI Working Pressure Diaphragm Motor Valve is designed to meet demand for top quality "economy" small high pressure valve. Features include: carbide trim and lifetime leakless teflon sleeve-Hycar combination stem packing. Valve has exclusive Parquip "tee" body, allowing it to be used as either angle or globe body type. When used as globe type, bull plug in the bottom body port serves as shock absorber to eliminate sand cutting on bottom of body. Body and yoke assembly is Parquip hammer nut-union design. Action of valve is easily changed from normally open to normally closed in the field with simple tools. Stem travel indicator is standard equipment. Valve has adequate spring to operate at 3,000 psi pressure; normally open or normally closed. Exclusive feature is carbide seat design which includes carbide choke which limits maximum flow without danger of cutting out. Valve is available in 1 and 2-inch body with topworks interchangeable; valves have same stem and seat, which eliminates necessity for stocking variety of stem and seat sizes.

For more data on above item, circle E363 on postcard, Page 243

"G-String" Liquid Level and Interface Control has no limit to range over which liquid level or interface can be controlled. Controller has a float suspended on stainless steel wire so arranged that it may be raised or lowered over any interval from outside the vessel without interrupting operation. Float may be set at any level, and control point will be on the float. There is no waiting to see where "leveling out" point is. Float is so designed that maximum changes in oil or water gravity will not cause liquid level to go out of control; the control point is always on the float. Thus, it is possible to adjust the greater interface from top to bottom of the vessel without interrupting operation: the interface stays regardless of changes in gravity of fluids. Maximum treater efficiency is possible because it is no trouble to change the operating level, and there is no doubt where new level will be after the change.

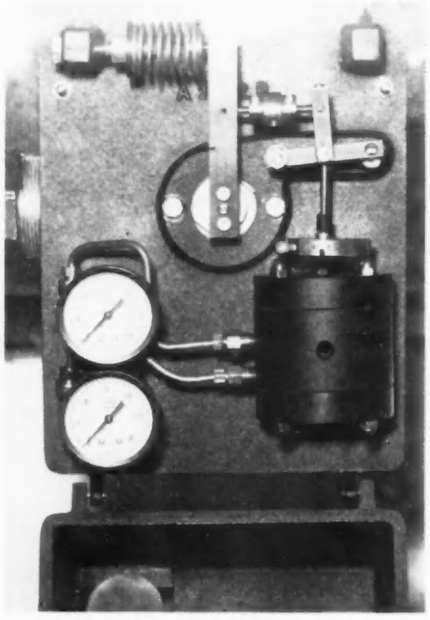
For more data on above item, circle E364 on postcard, Page 243



P-4900-GL Clamp-on Temperature Controller is unique in design and application. It requires no opening in the line carrying the fluid stream. It is not necessary to install an access opening in the line; no thermostat bulb socket is required. In fact, it is simply clamped on the outside of the line, a source of pilot pressure connected, and the control is ready to operate. Controller is available with direct or indirect operation, snap or throttling pilot output. Operating temperature range is limited only by temperature limitations of the pipe carrying fluid. Accuracy of temperature control is unsurpassed; advantages are particularly apparent in applications where hunting is a problem. Response to a change in temperature in the fluid is essentially instantaneous, since there is no time lag.

For more data on above item, circle E365 on postcard, Page 243

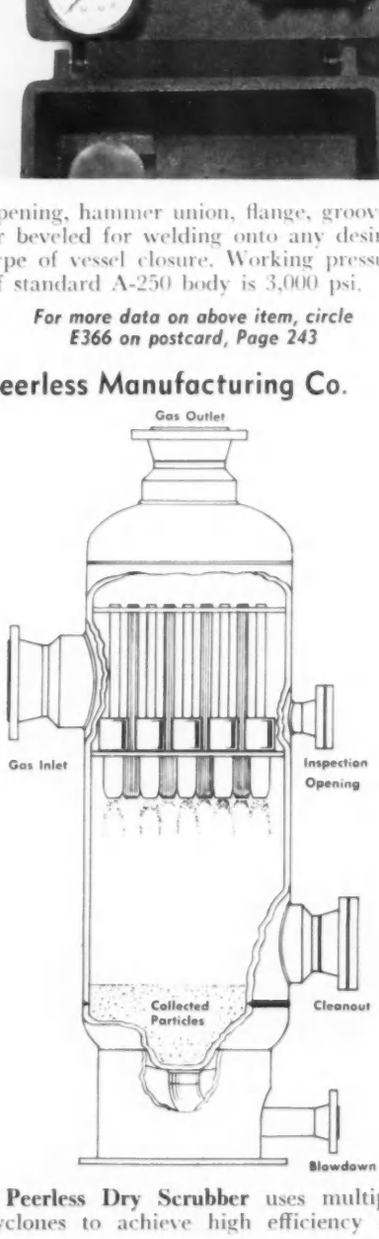
A-250 Precision Liquid Level Controller provides trouble free operation for either throttling or snap action liquid level control. The pilot is force-balance type with a variable area diaphragm which permits control sensitivity to be varied in stepless change from very broad to very narrow. Same adjustment on pilot can be used to vary action from unstable throttling to wide range snap action. Extreme sensitivity of pilot permits use of relatively small float within the vessel; such floats will easily pass through a two-inch pipe, which permits high pressure vessel construction without conventional heavy flanged opening for float access. Saving in vessel cost is appreciable. This small float is suitable for extremely close control of water-hydrocarbon interface regardless of the service, there is no requirement for "weighted" floats. One float will do all jobs. Controller is supplied with body to screw into a standard two-inch pipe



opening, hammer union, flange, grooved, or beveled for welding onto any desired type of vessel closure. Working pressure of standard A-250 body is 3,000 psi.

For more data on above item, circle E366 on postcard, Page 243

Peerless Manufacturing Co.



Peerless Dry Scrubber uses multiple cyclones to achieve high efficiency removal of dirt and liquid from gas lines. Scrubbers are offered in complete range of sizes and working pressures to fit any requirement. Cyclone elements are constructed of an alloy combining abrasion and corrosion resistance with shock resistant qualities needed for reciprocating compressor station requirements. Also available are compartmented scrubbers to handle widely varying flows with only one vessel where multiple scrubbers have been required heretofore.

For more data on above item, circle E367 on postcard, Page 243

Perkins Engines, Ltd.

Perkins Four 203 Industrial Diesel Engine is designed for mobile cranes, welding sets, and fork lift trucks, embodying a number of longer-life features plus low-cost running and maintenance. Engine is supplied either with hydraulic governor, for variable speed applications, when it develops 60 bhp at 2,400 rpm, or with mechanical governor for continuous use, when it develops up to 47 bhp at 2,000 rpm. Four 203 has a 3.6-inch (91.44 mm) bore, a 5-inch (127 mm) stroke and 203.5-inch (3.33 litre) capacity. An important feature is the practical method of meeting power take-off requirements. Timing is accomplished through a geared drive and allows power take-off from gearing at two points. A hydraulic pump, suitable for fork lift truck and other main hydraulic equipment, can be mounted off the camshaft gear. This pump, with a capacity of 17 gallons per minute at 1,700 psi can also be mounted beneath the fuel pump.

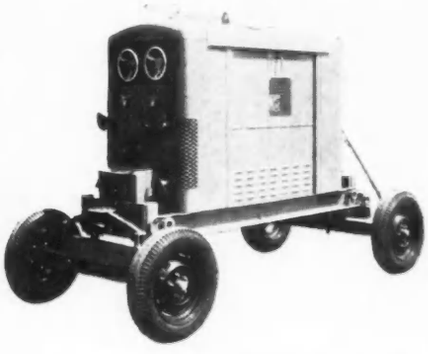
For more data on above item, circle E368 on postcard, Page 243

Petbow Limited

Skid Mounted Mobile Power House comprising two 125 KVA, 60 cycle diesel-generating sets, a composite control cubicle containing all the electrical control equipment, a bus-bar chamber, distribution switches and weatherproof

socket outlets. End and side panels are hinged and open outward to provide a rain-proof canopy. Each generating set is powered by Rolls-Royce Type C6NFL six-cylinder, normally aspirated diesel engine which develops 165 bhp at 1,800 rpm. Coupled to the engines by special PETBOW couplings are 125 KVA three-phase continually rated, self-regulating alternators which maintain their voltage within ±2½ percent at all loads. Generating sets are resiliently mounted to the floor and vibration and torsional shock are eliminated. A 150-gallon fuel tank mounted above the sets is sufficient to run both engines for 10½ hours on full load. Lugs are provided on skid mounting for lifting purposes.

For more data on above item, circle E369 on postcard, Page 243



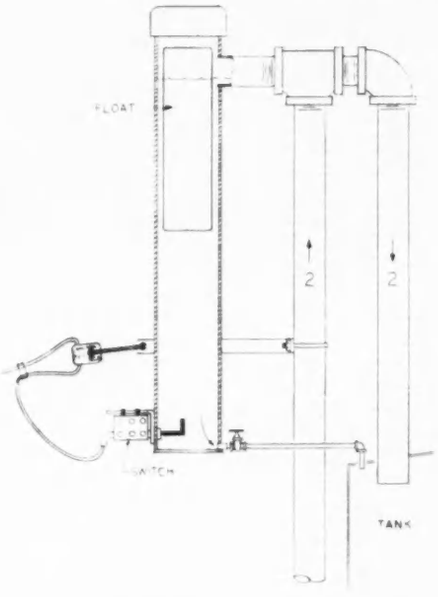
Petbow Welding Generator is designed for use in the most arduous conditions, where skilled maintenance is at a minimum. Features include: (1) Specially designed for coupling to a diesel engine. (2) Continuous current adjustment between maximum and minimum at near constant open circuit voltage. (3) No series resistance to burn out. (4) Fixed brushgear of heavy construction. (5) Ease of output control. (6) Easily accessible for servicing. (7) Synthetic enamel covered windings with glass insulation. (8) Continuous operation in 50° C. ambient. (9) All steel welded construction. (10) 8 KW at 65 volts available for operating hand tools. (11) Generators are suitable for motoring each other for engine starting.

For more data on above item, circle E370 on postcard, Page 243

Skid-Mounted Mobile Workshop has chassis of all welded construction with main chassis members forming the skid. Floor is of mild steel chequer plate and roof is double skinned and insulated to maintain proper temperature in workshop. One side has fixed 12-foot workbench and the other side opens upward to provide cover for hinged workbench to form external working space. Equipment, suitable for tropical use, includes power hacksaw, power drill, 8-inch bench type double-ended grinder, two-stage air-compressor, spray gun, forge and anvil, 30-ton hydraulic press, valve re-facer and valve seat grinder, complete set of gas welding and cutting equipment, 6-ton hydraulic jacks, battery charger, fuel injection test pump, grease pump, pneumatic tools. In cupboards under fixed workbench is a complete range of hand tools including drills, files, spanners, pliers, screwdrivers, taps, dies, measuring instruments, etc.

For more data on above item, circle E371 on postcard, Page 243

Petroleum Instrument Company



Peerless Well Pump-Off Control for Pumping Wells automatically shuts off the power—either gas engine or electric motor—when a well pumps-off. Purpose of control is to prevent unnecessary wear when on pumping unit, rods, and tubing, and to avoid waste of power when there is no fluid in the well to be lifted. Equally important, control unit shuts down pumping unit should sucker rods part, the pump gas-lock or sand-up, tubing become plugged with paraffin, a flow line break or mechanical failure of pump jack. Control will positively stop "dry pumping." It is extremely simple in design, has no wearing parts, and is easy to install.

For more data on above item, circle E372 on postcard, Page 243

Petrolite Corporation, Tretolite Company Division

Swabstix Flow Inducers provide simple method of swabbing a well by means of chemical reaction. Application, by dropping required number of units down the tubing, is a one-man operation. Each unit is 1¼-inch in diameter, 24 inches

long, and includes a slow-dissolving water-soluble, oil-insoluble plastic cylinder. Cylinder is filled with a powdered chemical that reacts with brine or water to generate a gas which causes well to flow. Water-soluble cylinder protects chemical from well fluids until the stick has fallen through the oil. One unit is capable of displacing 500 feet of fluid in 2-inch tubing. Swabstix are designed for use in wells that have ceased to flow because of the over balance of fluid head when fluids accumulate in tubing. This can happen during shut-in periods for acidizing, fracturing, inhibitor squeezing or workover operations.

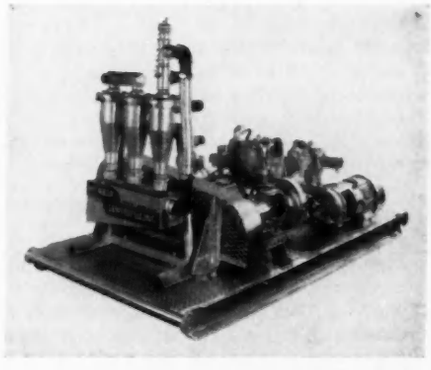
For more data on above item, circle E373 on postcard, Page 243

Photogravity Company, Inc.

Photogravity, combining a photogeologic analysis and gravimetric survey, features a number of benefits to be gained from coordination of geology and geophysics. Benefits include an improved photogeologic interpretation of the information gained from geophysics, increased efficiency and thoroughness by assuring gravity station control on all interesting photogeological features, and a more positive geological interpretation. There is no additional cost for the coordination.

For more data on above item, circle E374 on postcard, Page 243

Pioneer Centrifuging Co.

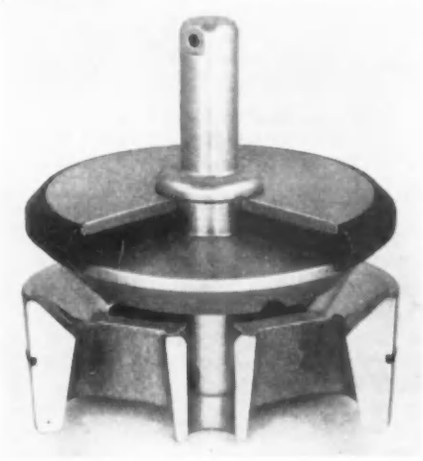


Model SSC and MSC Mud Cone Units are newly engineered, unitized, double-staged drilling mud cyclone units designed for operators in remote isolated areas. Units sustain maximum field cyclone efficiencies in stripping solids from expensive chemicals and water, or in salvaging barites where decanting cen-

trifuge service is not available. Features include: higher over-all average cone operating efficiency; most simple cone adjustment known, with completely visible results, and with no other adjustments necessary; mud loss from cone-plugging virtually eliminated; foolproof rig-up and operation with inexperienced help assured by color-coded connections and complete instruction manual; unskilled maintenance sufficient except on internal-combustion prime movers; all permitting drilling cost reductions in mud-trouble areas remote from supply and maintenance centers.

For more data on above item, circle E375 on postcard, Page 243

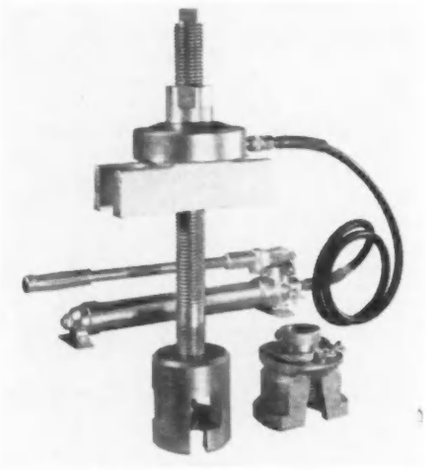
Pioneer Well Tools, Inc.



Web-Type Rotating Slush Pump Valve is a full-open seat rotating valve, designed for jet-bit drilling and for abrasive mud conditions. Rotating valve body reduces seat washouts by seating in a new position each stroke of the pump. The complete line of new valves feature reversible inserts in optional plain or nylon-reinforced oil-and-heat resistant Hycar compounds; all metal parts of selected alloy steels, heat treated and case-hardened at critical points; aluminum coated seats to reduce seisures; positive O-Ring seals on the seats; and threaded stems for simple changing of low-cost replacement parts.

For more data on above item, circle E376 on postcard, Page 243

Hydraulic Valve Seat Puller Jack has been annouced and field-tested which is capable of 125 tons pull without puller distortion. This is lightest weight heavy-duty puller available, constructed throughout of heat-treated alloy steels with buttress threads cut on puller screw which also permits maximum amount of rugged usage without loss of efficiency. Jack travel is ¾-inch using 0.70 pints of hydraulic oil from any 10,000 psi capacity hand pump. Sturdy crossbar fits all pumps; open-type or web-type heads



are available to fit this or any other popular puller; and puller stem can be furnished to fit any head. Puller is simpler to operate, easier to store, and costs no more than most wedge-type pullers. Quality is maintained by skilled machinists and each unit is individually hand-tested before shipping.

For more data on above item, circle E377 on postcard, Page 243

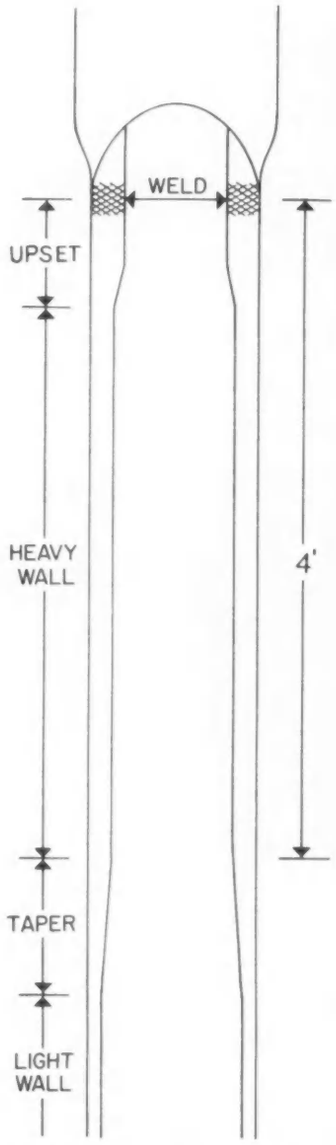
Pittsburgh-Des Moines Steel Co.

Hamondflote Plastic Covers provides floating roof protection for large and small field storage tanks. More than 100 installations have proved their effectiveness for cutting vapor losses in storage tanks up to 70 feet in diameter. New modular technique of installing the rigid polyurethane plastic segments of the cover extends its use to tanks of any diameter, regardless of number of internal supporting columns. Because of its low initial cost, simplicity of assembly and effectiveness in reducing evaporating losses, cover will pay for itself within several months of operating service. Operation is automatic, since it floats on surface of liquid. Unit can be equipped with automatic gage or connected to existing gaging facilities. It can operate to maximum and minimum capacity levels without use of special shut-off devices, and can be installed with no special tools or tank preparation.

For more data on above item, circle E378 on postcard, Page 243

Pittsburgh Steel Company

Dual Weight Drill Pipe provides strength and light weight never before available, has not less than four, or more than six feet of heavier wall thickness at box end. It is designed for lightweight rigs using drill pipe with lightweight body wall, or for heavy rigs drilling deep wells with regular weight body wall. Dual Weight has a gradual taper from heavy wall in the slip area to a lighter



body wall, providing a heavy duty upper end and lighter weight body. External dimensions conform to API standards. Both ends are upset for application of API weld-on tool joints. Redistribution of the steel gives extra strength in the most vulnerable area of drill pipe—the four feet which make contact with the slips.

For more data on above item, circle E379 on postcard, Page 243

Buttress Thread Casing is designed to meet demand for casing and joints suited to difficult service conditions of deep wells. It gives drillers a casing with a joint virtually as strong as the body of the pipe. Available in standard sizes, weights and grades, Buttress Thread provides these features: pipe thread is cut on ¾-inch taper to full run-out at outside diameter of casing; thread length in coupling covers all threads of the pipe, including vanishing threads; engagement is complete between all threads of casing and all threads at outer end of coupling; wall thickness under last engaged thread is substantially full wall thickness of pipe.

For more data on above item, circle E380 on postcard, Page 243

R & W Engineering Service Co.

Akra-ez Oil Test Kit determines quality of hydraulic or lubricating oil on the job with complete oil analysis in 12 minutes or less. Oil analysis plays an important role in preventative maintenance programs for all types of motorized and hydraulic equipment. Kit provides simple test procedures for visually showing oil viscosity and rate of contamination by water metals and/or insoluble solids. It provides a method for plotting and determinating acidity (oxidation) of oil. Complete oil analysis prevents premature oil changing, prevents use of contaminated, harmful oil, assures maximum performance and protection of equipment. Easy-to-use kit has complete directions. Includes neutralization number, viscosity, centrifuge, thermometer, sample bottles, syringe, manual, set of charts, and handy carrying case.

For more data on above item, circle E381 on postcard, Page 243

Radio Corporation of America

RCA "LD" Transistorized 2-way Mobile Radios are designed to allow extended operation with vehicle engine turned off. Uses only "stock" transistors, inexpensive to replace and capable of being serviced using existing test equipment and techniques. Prices in same range as comparable all tube-type equipment. Radios are availabie in two models: "LD" 50 for 25-54 MC operation and "LD" 150 for 148-174 MC operation. Both models feature "Security Sealed" circuits with transistors soldered in to withstand the roughest usage and "Road Map" component coding for easy maintenance. Either unit may be mounted under dash of vehicle or in remote locations with only controlhead and speaker under dash. Transistorized 2-way radio design is particularly suited for use by drilling, pipeline and utility crews.

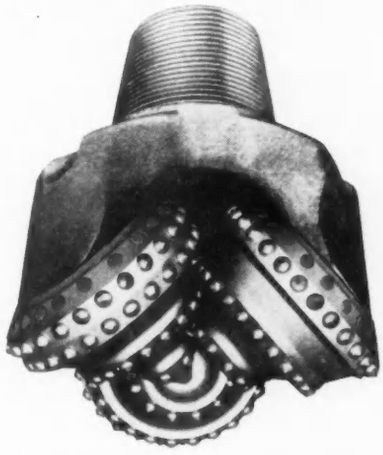
For more data on above item, circle E382 on postcard, Page 243

Reda Pump Company

X-7, X-4 Model Reda Submergible Water Pumps are designed for use in 3-inch and larger wells. They provide capacities from 120 to 665 gallons per hour, and pump from depths to 200 feet. They are the first submergible type pumps built to operate in wells less than 4 inches in diameter. Pumps are constructed of corrosion-resistant materials including bronze impellers and diffusers, stainless steel shaft and special Reda seals. Motor is oil-lubricated to provide years of trouble-free pumping. Both pumps operate from 115 volt, single phase power supplies, and both are rated at ½ horsepower. Reda Pump Company now offers complete line of submergible pumps from ⅓ to over 300 horsepower.

For more data on above item, circle E383 on postcard, Page 243

Reed Roller Bit Company



YC-3G Rock Bit is equipped with closely spaced, sharp pointed tungsten-carbide inserts, enabling faster penetration and increased footage to be attained in drilling such hard formations as hard shale, conglomerates, hard broken formations, and limestones, and in the harder formations such as granite, chert, flint, quartzite, taconite, and basalt. A row of special flat-end inserts on the gage surface of each cutter assures maximum protection against under-gage hole. The YC-3G design is particularly adapted for hard formation drilling with air or gas, using special lugs provided with passages to conduct a constant flow of air, to cool and clean the bearings and thus minimize wear.

For more data on above item, circle E384 on postcard, Page 243

YT-1A Rock Bit has improved design for a wide range of soft to medium formations or soft formations interspersed with harder streaks, such as firm, unconsolidated, or sandy shales, red beds, salt, anhydrite, and soft limestones. Improved balance between the gage teeth and inner rows of teeth on each cutter gives longer and more uniform tooth and bearing life. Tooth depth has been increased. A stronger bit results from improved proportioning of bearing structure, improved basic bit geometry, and thickening the cutter section. Improved hard metal dressing on the gage and inner rows of teeth adds to bit life and increases drilling speed.

For more data on above item, circle E385 on postcard, Page 243

YHW-G Rock Bit is designed to drill and hold gage effectively in the hardest formations drillable by rock bits equipped with conventional tooth patterns. These include such hard, abrasive formations as chert, quartzite, pyrite, granite, chat, dolomitic and quartzitic sand rock. The teeth of the YHW-G are closely spaced and the bearing structure is designed to withstand extremely heavy impact loading. The web between the gage teeth provides a large gage-cutting area, and also adds to the peripheral strength of the bit. Maximum abrasion resistance is obtained in the YHW-G through the addition of a row of flat-end tungsten carbide inserts on the gage surface of each cone.

For more data on above item, circle E386 on postcard, Page 243

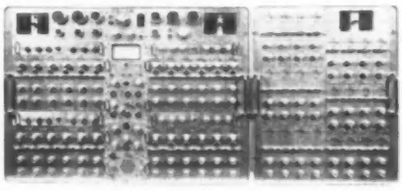
YTL Rock Bit is an improved design for soft-to-medium formations such as unconsolidated shales, red beds, salt, gypsum, soft limestones, and chalk. The

from DRESSER ELECTRONICS SIE DIVISION

these new

TO SAVE YOUR

EXPLORATION



PT-100 TRANSISTORIZED SEISMIC AMPLIFIER with radically improved signal-handling capabilities to eliminate distortion

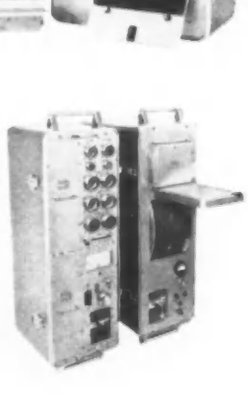
The PT-100 combines obvious transistor design advantages — low power drain, light weight, compact size — with performance improvements allowed only by solid state components. It is a significantly new seismic amplifier.

Use of a light-sensitive photocell as an AGC element provides signal control never before possible. This amplifier will not overload in any area. Transistor circuits eliminate maintenance problems such as are inherent with vacuum tube designs. Low-cut filters in the geophone line help insure negligible overall distortion. Operator-oriented master controls provide separate record and playback adjustments for both "early" and "final" amplifier gain.

Significantly improved results are now possible in refraction, reflection and high frequency recording with the all new PT-100.

TRO-6 TRIPLE RECORDING OSCILLOGRAPH provides multiple display but needs only one galvo block

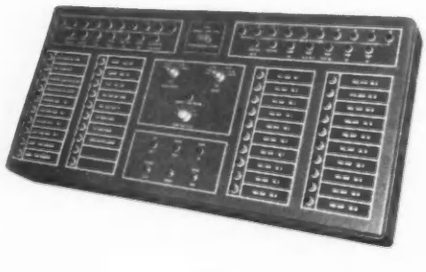
From SIE comes the first multiple display oscillograph requiring only one galvo block. Choose variable density, variable area, conventional wiggle, variable-density-and-wiggle superimposed, or variable-area-and-wiggle superimposed. Timing lines may be from flasher tubes or timing motor. Flashers, driven from self-contained circuitry, can be controlled by an internal fork or from a tape playback signal. Record speed is accurate and repeatable with "locked-in" drive. A synchronous motor — completely free from "camera hash" — is driven from a built-in transistorized amplifier with a 400 cps drift-free, non-position-sensitive fork. Answer all your oscillograph recording needs with this one camera.



PMR-20 PORTABLE FM MAGNETIC RECORDING SYSTEM for high-fidelity field records.

Two compact units contain a complete 24 trace high-fidelity FM magnetic recording system, the PMR-20. The MR-20 Transport Unit houses the recording drum, drive system and recording heads. The MU-20 Master Unit contains the modulators, demodulators and auxiliary electronics. Each unit has its own built-in transistorized power supply. PMR-20 FM recording provides an improved signal-to-noise ratio and lower distortion as compared to other recording systems. A frequency response of from 1 to 500 cps coupled with frequency-modulation recording provides true high fidelity performance. Join the many users of more than 50 PMR-20 systems already in the field.

LEASE AUTOMATION



SIEMARC DISPATCH CONSOLE IN PHILLIPS VENEZUELA SYSTEM designed to permit unattended operation of offshore platform.

Automatic, one-man control of a twenty-well lease from this single console seventy miles away is possible by dependable, solid-state SIE equipment. Scanning, display and logging of alarms and data is included with shutdown control for wellhead and processing equipment. Modular construction of components and sub-assemblies allows system flexibility at minimum cost. All control, alarm and data signals are handled in error-safe digital code. Complete fail-safe design and continuous monitoring assure installation safety.

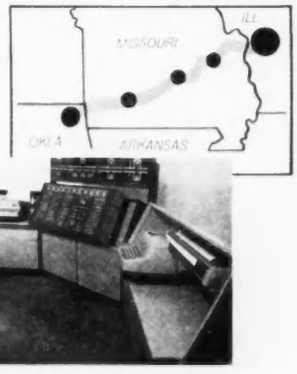
products

TIME AND MONEY

PIPELINE CONTROL

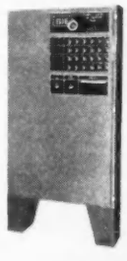
DISPATCHERS CONSOLE used by Cherokee Pipe Line Company for automatic control of liquid line.

SIEMARC Supervisory Systems provide automatic monitoring and remote control for many industrial operations and processes including the petroleum installation pictured. Measuring, data gathering, telemetering, logging, display, indicating and computing are all integrated in the system. Both solid-state and relay components are used as dictated by proper engineering design. Transistors and semiconductor diodes are utilized in all high-speed switching and logic circuits including encoders, decoders, analog-to-digital converters, deviation detectors and magnetic drum circuitry. Separate electric logging typewriters record data and alarms.



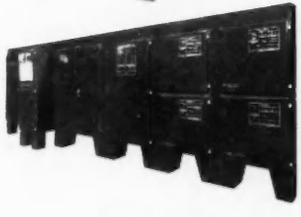
POWER LEVEL CONTROLLER used by Shell Pipe Line Co. for maximum pumping station operating economy.

Completely unattended operation of a multi-unit pumping station is possible with a Power Level Controller now in use by Shell Pipe Line Co. The unit accepts signals from flow and pressure pickups and makes logic decisions to bring proper combinations of pump units on or off stream automatically. It may be connected to the supervisory control system to permit reset of power levels from a central office dispatching console.



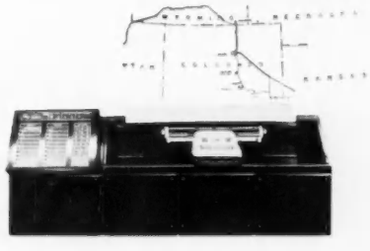
COMPRESSOR STATION CONTROL CONSOLE including complete engine control equipment for automatic station operation and safety.

For gas transmission automation, the basic SIEMARC system can be coupled with Log-Alarm Shutdown and Engine Control-Sequence units. Building block design throughout allows SIE to fit your needs exactly.



DISPATCH PANEL used by Colorado Interstate Gas Company.

In the Colorado Interstate Gas Company installation shown, dispatchers transmit only desired discharge pressure settings; automation at each compressor station responds by maintaining the selected value for optimum station economy. If communication links fail, local automation operates without interruption. Log-Alarm units insure station safety. Dispatchers are alerted only when trouble occurs.



The equipment shown here—and all the rest from SIE—illustrates the company's fundamental design concept: electronic systems and products to provide you with fastest payout and lowest overall operating expenses.

Accelerate your present cost reduction program by writing:

DAY	NIGHT	SERVICE
Call: SUnset 2-2083 Houston		

DRESSER ELECTRONICS

SIE DIVISION / ONE OF THE DRESSER INDUSTRIES

10201 Westheimer, Houston 42, Texas

For more data on advertised products, use Readers' Service Cards, last page.

tooth pattern and tooth shape increase its effectiveness over a wider range of formations. Heavier, more widely spaced teeth and increased tooth depth give faster penetration, and the use of the "L" type gage teeth on two cutters results in a more balanced cutting action. Increased thickness of the cutter section, and improvements in basic bit geometry and in proportioning of bearing structure give greater strength to this bit. Better balance between the rows of teeth on each cutter gives longer, more uniform tooth and bearing life. An improved application of hard metal to the teeth further adds to bit life and increases penetration rates.

For more data on above item, circle E387 on postcard, Page 243

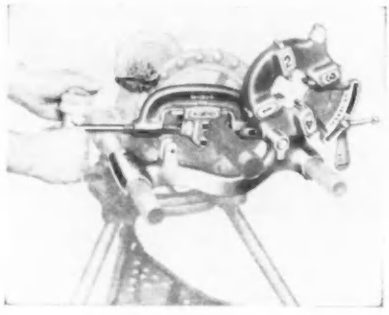
Ridge Tool Company

RIDGID No. E-110 Offset Hex Wrench is designed for use on hard-to-get-at nuts and fittings in tight quarters. Easy-on, non-slip, multi-sided grip gives extra leverage on all hex nuts, square nuts, valve packing nuts, unions and gas cocks. Eliminates rounded nut shoulders and bruised knuckles. Thin jaws were designed to fit narrow nuts and to slip into tight places. Jaws have maximum opening across flats of 2⅛ inches and will handle up through 1½-inch drain nuts. Alloy malleable housing is guaranteed against warping or breaking. Comfort-grip I-beam handle has handy hang-up hole.

For more data on above item, circle E388 on postcard, Page 243

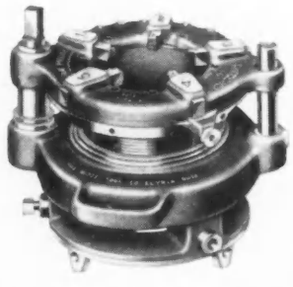
C-14 and C-18 Chain Wrenches expand RIDGID Work-Saver line to 44 different types and sizes. Built for long rugged use, new wrenches are designed for work in extra tight quarters. They feature fast, ratchet-like action in either direction, from either side. Chain gives tight grip without crushing on all round, square or irregular shapes. Tempered steel link chain has large easy-to-grab finger ring for fast adjustment. Chain catches quickly and securely on double lugs. C-14 handles up to 2-inch pipe and fittings; C-18 up to 2½-inch pipe and fittings. Sturdy, comfort-grip I-beam handle is made of alloy malleable and is guaranteed not to warp or break.

For more data on above item, circle E389 on postcard, Page 243



Three Low-Cost Accessories immediately convert RIDGID 300 Power Drive into a fast, smooth-operating pipe and bolt threading machine. First is the strong, lightweight aluminum 310 Carriage, which slips on support arms of No. 300, and holds the die head and cutter exactly like a pipe machine. Carriage slides easily, snugs right up to check for close threading and cut-off. Second, 360 Cutter. This full-floating, wheel-type cutter features wide rolls for straight cuts at pipe machine speed. Finally, 310 Carriage is designed to accommodate any RIDGID 500 series Quick-Opening Dies, pipe or bolt. Single fine-adjustment screw on carriage aligns each die head for true threads every time. Both die head and cutter operate independently, swing up and stay out of way when not in use.

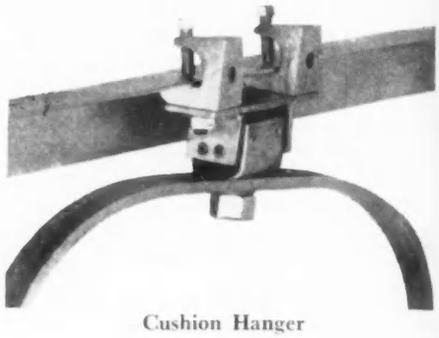
For more data on above item, circle E390 on postcard, Page 243



RIDGID No. 161, 4-inch to 6-inch Geared Pipe Threader is jam-proof for safe threading with power drive. There are no dies to change. Threads 4, 4½, 5, and 6-inch pipe or conduit with just one set of dies that are cam activated and can't fall out. Size setting is fast, easy and positive. Two spring knobs lock dies at clearly marked thread size. Easy adjustment for straight or tapered threads. Fully adjustable for over or under size threads. No bushings are necessary. RIDGID plate type workholder sets to size before threader is placed on pipe. Single screw is tightened to secure workholder to pipe.

For more data on above item, circle E391 on postcard, Page 243

Rig-A-Lite Company



Cushion Hanger

Cushion Hanger-In Use

Save-A-Lite "Cushion" hanger for rig lighting systems contains a molded neoprene element. This special feature provides longer bulb and fixture life by absorbing rig vibrations and dampening impact shock. Metal-to-metal contact is eliminated. The positive locked neoprene element also makes a safety chain unnecessary. Design permits fixtures to be mounted either vertically or horizontally. Though designed by the Rig-A-Lite Company for their lighting systems, the Save-A-Lite "cushion" hanger is available as a separate item. It will fit most rig lighting systems.

For more data on above item, circle E392 on postcard, Page 243

Trav-A-Lite is a patented, portable light tower which provides ideal lighting for well servicing and workover rigs. Its portability meets the one-package lighting needs of contractors having more

Trinity
LITE-WATE

A Complete Low Density Cement that is

HIGHLY IMPERMEABLE

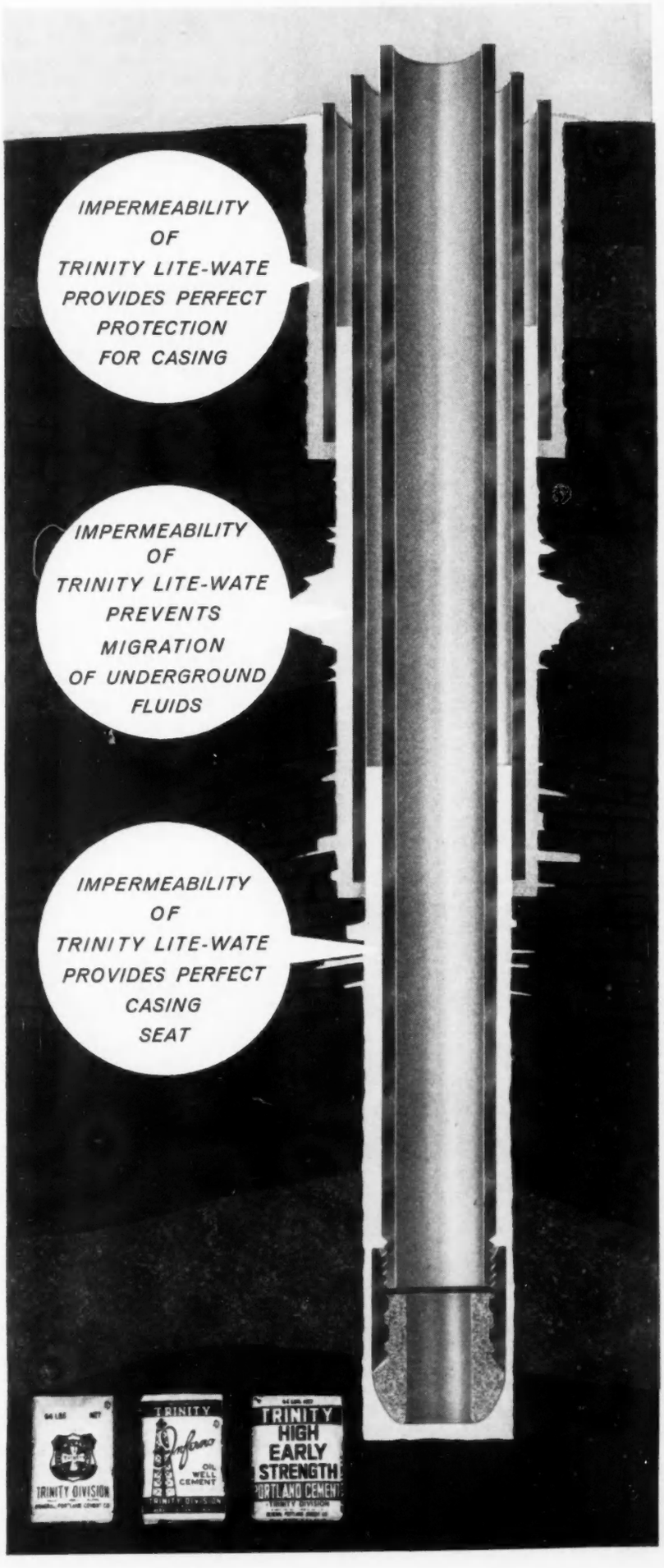
Trinity Lite-Wate fulfills all important functions when placed in an oil or gas well.

PERMEABILITY TEST DATA

All slurries were prepared according to procedures of API RP IOB and cured at 140°F and atmospheric pressure for 72 hours.

Percent Mixing Water	Slurry Wt. Pounds Per Gallon	Permeability Millidarcys*
65	13.66	0.001
75	13.18	0.001
85	12.77	0.001
95	12.44	0.001
105	12.14	0.002
115	11.89	0.003

*A darcy is that measurement of permeability that will permit a liquid having a viscosity of one centipoise to flow at the rate of one milliliter per second through a specimen one centimeter in length and having a cross section of one square centimeter under a pressure difference of one atmosphere. A millidarcy is 0.001 darcy. The permeability of Trinity Lite-Wate cement is expressed in millidarcys.


IMPERMEABILITY OF TRINITY LITE-WATE PROVIDES PERFECT PROTECTION FOR CASING
IMPERMEABILITY OF TRINITY LITE-WATE PREVENTS MIGRATION OF UNDERGROUND FLUIDS
IMPERMEABILITY OF TRINITY LITE-WATE PROVIDES PERFECT CASING SEAT
TRINITY DIVISION
TRINITY
OIL WELL CEMENT
TRINITY HIGH EARLY STRENGTH PORTLAND CEMENT

TRINITY

PORTLAND CEMENT DIVISION
GENERAL PORTLAND CEMENT COMPANY

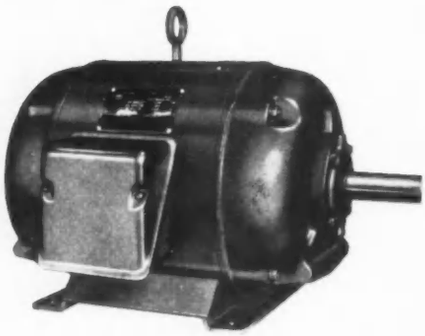
GPCC

DALLAS·FT.WORTH·HOUSTON

than one rig without lights. The Trav-A-Lite is manufactured trailer, or skid-mounted, and is entirely self-contained, consisting of a generator, extension tower and three or more floodlights. The unit can serve as a light and power source. No guy lines are required for the 35-foot tower. Production facilities will be kept entirely flexible so that individual specifications, even to type of generator, may be met. While in transit, the unit is horizontal, the extension tower retracted. Upon being positioned for use, mechanical erection of the unit and extension of the telescoping tower are simultaneous, enabling the unit to be in operation only a few minutes after being positioned.

For more data on above item, circle E393 on postcard, Page 243

Robbins & Myers, Inc., Motor Division



All-Weather Hi-Slip Motors, in 1,200 rpm speeds, provide 7 to 9 percent slip while operating within 40°C. temperature rise limits. Completely "weatherized" for outdoor use. Steel parts are undercoated with a rust inhibitor. Cast iron parts have anti-corrosion primer. Windings are twice varnish-dipped and baked. Terminal box is gasketed and leads are sealed at motor shell. DuPont Mylar insulation lines the slot cells. Double-width, sealed, pre-lubricated ball bearings are used. An easily removable cover plate permits bearing inspection without removing motor end heads. Rodent screens are factory-installed. The end-to-end, "clean-sweep" ventilating system eliminates need for side vents. Thus, there are no converging air currents that might deposit dirt within the motor.

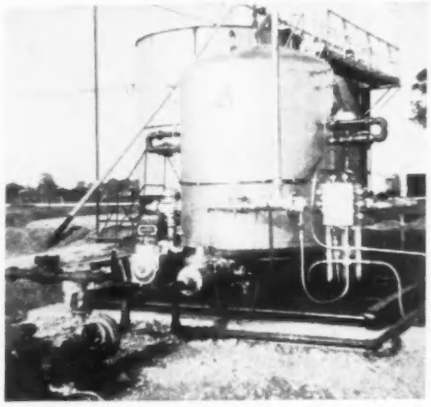
For more data on above item, circle E394 on postcard, Page 243

Wm. L. Riggs Company

"Safety Boy" Flange Spreader Tools have been supplemented with Model 104, designed for separating Ring Joint Flanges. Hours of shutdown time can be saved by using this rugged lightweight tool which can spread a flange in seconds. Operating principle of "Safety Boy" is as follows: Pressure, applied by a ratchet handle forces patented circular cam wedge between the flanges. Cam wedge prevents damage to flange spaces and gaskets by exerting evenly increasing pressure. "Safety Boy" operates effectively in restricted spaces. In addition to efficiency in maintenance operations, this tool eliminates many hazards. No hammer blows, no flying wedges, no chisels, no sparks. Models serve all flanges and all pipe sizes.

For more data on above item, circle E395 on postcard, Page 243

Rolo Manufacturing Company



LACT Meters, designed for use on leases where payment for oil is made on meter readings, are guaranteed to meet all standards for accuracy and dependability in metering service. Meters, available in single or double chamber units, can be used on individual or multiple wells with gravity, pump or pressure discharge. An important feature of meters is that pump suction is never lost, and under pressure operation, gas is never blown down the line. Electric, pneumatic or electro-pneumatic controls are optional. An exclusive, reliable temperature compensator is another outstanding feature. Metering chambers are plastic coated to prevent paraffin deposits. Units are available in sizes to handle all flow rates. Rolo can provide either individual meters or complete packaged systems with temperature compensation, ticket printers, cut monitors, samplers, pumps and other accessories. Positive-Displacement meters also are available.

For more data on above item, circle E396 on postcard, Page 243

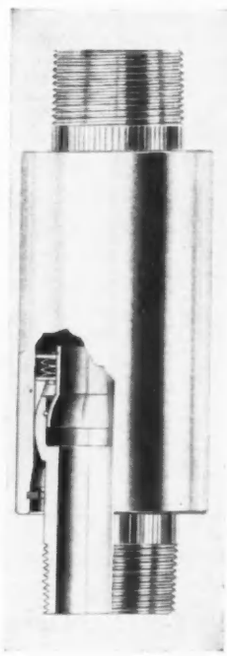
Ross-Martin Company

Material Classification Manual, for Petroleum Accountants, is designed for joint interest projects. This is a revised edition of the work of a special committee of the Petroleum Accountants Society of Oklahoma (PASO) and has been endorsed and adopted by the Petroleum Society of Houston. The book provides a medium for uniform handling of material and equipment in joint interest operations that are subject to record control, inventory and adjustment of overages and shortages. A most important manual to insure uniformity in classifying material and equipment for joint interest accounting. 60 pages, plastic binding, 8½ x 11.

For more data on above item, circle E397 on postcard, Page 243

Rotherm Engineering Co., Inc.

Expansion Joint with Double Ball Assembly is used for expansion and piping misalignment. Eliminates highly stressed thin wall stainless steel bellows. No packing is required, thus there are no high friction loads imposing additional thrust on anchors and maintenance is eliminated. Expansion Joint seal is accomplished by a patented teflon wedge seal, which requires no lubrication and is chemically inert. Designed for maximum pressure of 500 psig; maximum temperature of 500° F. Available in sizes ½-inch to 6-inch inclusive.



For more data on above item, circle E398 on postcard, Page 243

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LARKIN PACKER COMPANY

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WAXAHACHIE, TEXAS

LARKIN LEADERSHIP HAS BEEN EARNED BY YEARS OF DEPENDABLE PERFORMANCE

Roto Hammer Company

Automatic Lubricator with Roto Hammer lubricates plug valves as device opens and closes all standard valves (sizes 1½-inch through 8-inch). Can be operated by one man either by hand or remotely controlled by chain or extension rod. Lubricator is designed so as valve is opened or closed, a screw type plunger activated by ratchet principle at the unit's top is screwed in, grease from a reservoir is forced into internal parts of valve. Lubricator is so constructed that rachet-operated plunger rotates approximately 180° allowing valve to be opened or closed approximately 75 times before grease supply is exhausted. Since valves can now be effectively operated from ground level, overhead platforms and routing overhead lines to operators' reach can be eliminated.

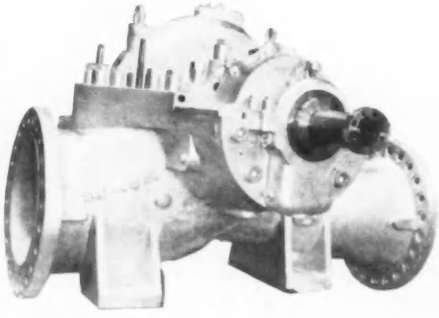
For more data on above item, circle E399 on postcard, Page 243

Royston Laboratories, Inc.

Royston Line Travel System for a single-pass cold application of Roskote Line Travel Mastic and Royston Insulation Tape to pipe from 4 to 36 inches in diameter. Coating system, totaling 55 mils thickness, requires only minimum size coating crews and provides a combination pipe coating and wrap that is highly insulative against practically all corrosive effects. Application is by standard line travel equipment requiring only minor modifications.

For more data on above item, circle E400 on postcard, Page 243

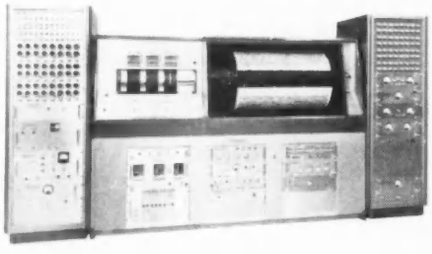
Ruhrpumpen G.m.b.H.



Single and Multi-Stage, Double-Suction Pipe Line Pumps, ZM include following features: Volute casing is split along its horizontal center line. Suction and discharge branches, as well as mounting feet, are on the lower casing half. Hence the complete rotor can be easily removed without dismantling the pipe lines. To obtain high efficiency, we have ceased to use double volute casings. Impeller is of double-suction type and therefore virtually free from axial thrust. Amply dimensioned shaft is protected by special sleeves in the liquid spaces to prevent any contact of the liquid with the shaft. Amply dimensioned, oil lubricated antifriction bearings, or alternatively oil lubricated journal bearings are used according to existing working conditions. Stuffing boxes are easily accessible. Mechanical seals can be used. Range of capacity: Q from 275 to 18,300 imp. gpm. H from 490 to 3,280 feet.

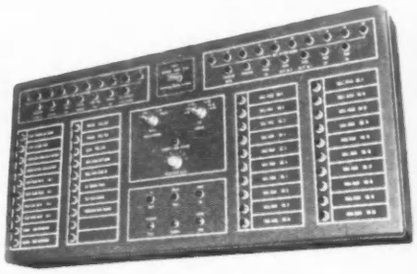
For more data on above item, circle E401 on postcard, Page 243

SIE Division, Dresser Electronics



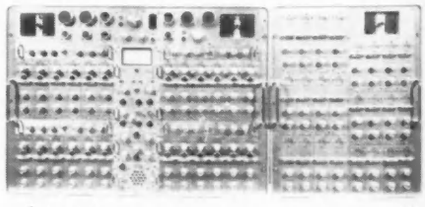
SIE MS-31 Geophysical Data Processing Unit combines features of five previous systems to provide a completely flexible, versatile and rapid means of producing time corrected cross sections. Both FM and AM magnetic tapes may be handled. Cross sections can be isopached or set to desired reference planes for best geological interpretation. Sections may be plotted with pen recording and any one of several modes of photographic displays simultaneously: variable-density, variable-area, multiple clipped traces, conventional wiggle, or variable-density-plus-wiggle superimposed. Three magnetic drums provide for high production compositing or virtually unlimited playback record combinations for record improvement. Normal move-out corrections up to 390 ms. may be made. An electronic error compensator for use with proportional NMO settings and large delta T is optional. NMO, weathering and elevation are inserted at same time cross sections are made to prevent lost time.

For more data on above item, circle E402 on postcard, Page 243



SIEMARC Automatic Lease Control System is employed for remote control automatic well test and monitoring of lease production, particularly in offshore and remote locations. Commands or action signals in one direction and measurement or alarm signals in the other are sent and received in error-free digital form. Solid state components increase reliability. Modular design facilitates system additions after initial installation. Basic control funtions include remote positioning of rotary chokes for each wellhead, emergency shutdown, and cyclic sequencing of individual well tests with automatic flow diversion. For data acquisition, automatic logging provides for scheduled or on-demand printout of time, well identification, test duration, BS&W, oil flow, gas flow and choke position, plus other data pertinent to the particular lease. Any normal communication channel may be used. There is virtually no limit to number of stations in a system. Colored lights at central control console indicate conditions and alarms. Measurements appear on digital indicators or are printed by electric output writer.

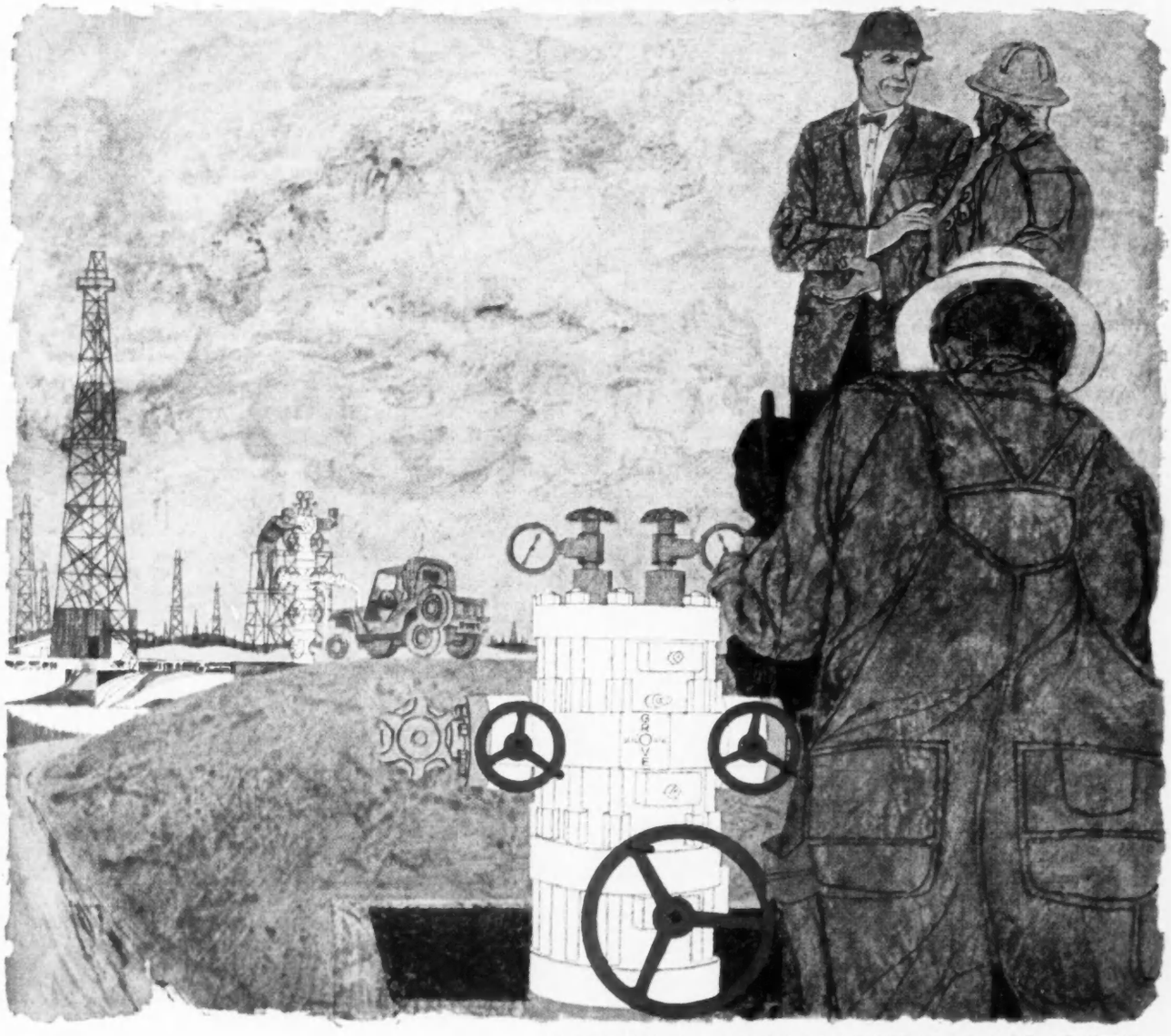
For more data on above item, circle E403 on postcard, Page 243



PT-100 Transistorized Seismic Amplifiers combine obvious advantages of solid-state design-low power drain, light weight compact size—with performance standards never before possible. PT-100 is a significantly new amplifier. Use of light-sensitive photocell as AGC element provides signal control and distortion characteristics vastly improved over former vacuum tube designs. This amplifier will not overload in any area. Transistor circuits also eliminate many maintenance problems inherent in former equipment. Low-cut filters in the geophone line help

Grove Valv-Pak offers many advantages: the lightweight and compactness of an integral Christmas Tree valve assembly—plus the flexibility of conventional assemblies permitting any single component to be changed in the field without replacing the complete unit. Unique Grove Valv-Pak construction permits factory tailoring to suit your precise needs for every single or multiple completion. Proven Grove protected Seal-"O"-Ring® design, featured in the Valv-Pak, assures a positive, bubble-tight seal, eliminates the need for lubrication. Write for Valv-Pak information.

VERSATILE VALV-PAK MAKES WELLHEADS SIMPLE, MORE COMPACT



GROVE PRODUCTION VALVES

GROVE VALVE and REGULATOR COMPANY

a subsidiary of Walworth

6529 Hollis Street, Oakland 8, California

Offices throughout the U.S. and in Western Canada

6325

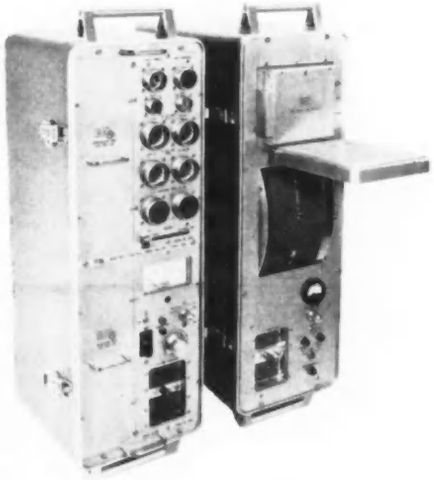
insure negligible distortion. Operator-oriented master controls provide individual record and playback adjustments for both "early" and "final" amplifier gain. Bandwidth and filter adjustments make PT-100 ideally suited for all types of seismic recording—refraction, reflection and high frequency.

For more data on above item, circle E404 on postcard, Page 243

TRO-6 Triple Recording Oscillograph answers all needs in one unit. Versatility of display and timing allows TRO-6 use in applications ranging from simple, conventional wiggle-trace field recording to the most complex office playback use. Variable-density, conventional wiggle, variable-density-and wiggle superimposed on variable-area-and-wiggle superimposed are the possible modes of operation. The same single galvo block is used in all cases. A synchronous drive motor is powered by solid-state power amplifier fed from temperature compensated 400 c-p-s non-position sensitive reference fork. Electronic flasher tube timing is usually employed. Excitation may be from a 100 c-p-s external tape playback signal or from built-in precision transistorized fork-controlled drive circuity. All timing line widths are individually adjustable for ease in record interpretation. A 400 c-p-s timing motor may be easily substituted for flasher tubes if desired.

For more data on above item, circle E405 on postcard, Page 243

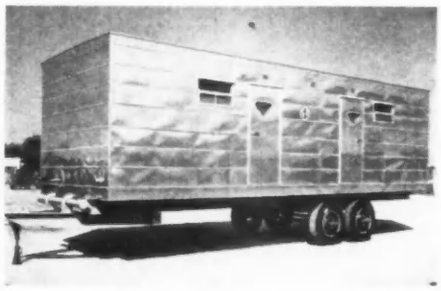
SIE PMR-20 Portable High-Fidelity Magnetic Recording System is a 24-channel transistorized field recorder housed in two lightweight, compact units. Recording and playback modulation levels are read from a convenient front panel meter. Movable or fixed heads can be supplied as required. Provisions are made to play back tapes through standard seismic amplifiers or directly through their output transformers. PMR-20 provides 60 db (rms) signal-to-noise ratio at a band-width of 1 to 500 cps within 1 db. FM recording eliminates effects of tape imperfections and irregularities. Within six months after introduction, over fifty PMR-20's were in use around



the world. Total harmonic distortion is less than 1 percent and crossfeed is well below recording system noise level. Total operating current for either record or play-back is less than 7 amperes at 12 volts dc.

For more data on above item, circle E406 on postcard, Page 243

S & R Tool and Supply Company



Wheel Mounted Personnel Trailers are designed to meet camp requirements by exploration and drilling crews operating anywhere in the world. Trailers include complete living units, plus specialized kitchen, bath, office, laundry, dispensary, and other type units. Trailer construction can be of all steel, all aluminum, or wood and aluminum. The heavy duty running gear and trailer frame make these units suitable for off-road travel. S & R trailers are also available on oilfield-type skids suitable for tail boarding, or with removable running gear.

For more data on above item, circle E407 on postcard, Page 243

Schlumberger Well Surveying Corp.

Sonic Log and **Caliper Log** has been combined into a single, simultaneously recorded operation. Combination results in increased logging efficiency and lower costs. In addition to its many other applications, the Caliper Log is valued by log analysts as an aid to interpretation of the Sonic Log. In particular, when viewed together with Sonic or other open hole logs, it helps to identify those formations which are permeable. Simultaneous recording of the two logs on the same film facilitates interpretation. In addition to reduced logging charges resulting from the combined services, savings to the operator include a reduction of rig time expended in logging operations.

For more data on above item, circle E408 on postcard, Page 243

Saunders Brothers

Saunders Blue Top Oil Saver features easy installation and exceptionally clean line wiping. Do not have to cut line to install, thus reduces installation time and returns great savings to wire line stripping cost. Other features are: (1) Rubber wear is compensated by hydraulic pressure furnished with a standard grease gun. Use of hydraulic pressure from remote pump using pressure hose connection is also available. (2) All-steel construction. (3) Exposed parts plated to resist corrosion. (4) Choice of one or two-stage wiping action. (5) Clearance inside for 1¾-inch rope socket. (6) One-piece, low-priced replaceable packing rubber and line guide. (7) Wear parts easily accessible and easily replaced.

For more data on above item, circle E409 on postcard, Page 243

Security Engineering Division, Dresser Operations, Inc.

Jet-Bit, one piece, has nozzle that extends beyond the bit body to place

nozzle exit closer to bottom of hole, thus increasing amount of jet energy available for bottom-hole cleaning and chip removal. A retaining pin, which eliminates usual snap-ring retainer, holds one-piece extended nozzle in place and provides a positive locking method. This feature provides more space for additional nozzle wall thickness and strength to resist breakage.

For more data on above item, circle E410 on postcard, Page 243

Seiscor Division, Seismograph Corporation

Telepath Miniature 2-Way Radio Systems are light-weight, portable, provide wireless communications for person-to-person use. Completely transistorized, with crystal-controlled transmitter and crystal-controlled receiver. Transceiver unit weights only 12 oz., including batteries. Available in Helmet and Belt-Clip models, each including transceiver, headphones, microphone, antenna and control. Optional Voice Operated Control ("Vox") available for all models. Units designed for use on any single frequency between 20 - 50 mc., and no license required. Units may be used indoors or out, are especially useful in high noise (up to jet-engine type noises) or poor visability conditions where direct vocal or visual contact is impossible. Other models include pocket-size 2-way radio unit, a base station 5-watt unit, and units for firefighting suits and other special clothing.

For more data on above item, circle E411 on postcard, Page 243

Industrial Wired Communications Systems provide intelligible communications under any noise conditions, including jet-engine type noise. They utilize transistorized amplifiers in combination with a variety of earphone/microphone headsets, to form "wearable" units for almost any type operation requiring wired, person-to-person communications. Two amplifiers available, one for low to medium background noise conditions and one for medium to high background noise conditions. Both are lightweight models that clip on your belt, and both have self-contained batteries. A unique feature is volume control, which permits user to choose the most comfortable listening level. For most applications, distance between units is unlimited, and party-line operations with three or more units working together is possible.

For more data on above item, circle E412 on postcard, Page 243

Telepath Industrial Wired Communications System provides high volume in high background noise level areas. Also models for normal to low background noise level areas. System includes headset with microphone, amplifier in Belt-Pack, and safety caps, where head protection is required. Three models of headsets are offered and two different amplifiers. One amplifier, for low noise to average noise level areas has output of 25 mw. Other amplifier for use in high noise level areas (including jet engine type noises to 145 db level has output of 200 mw. Noise-cancelling earphones and microphone are used in high noise level units.

For more data on above item, circle E413 on postcard, Page 243

Select Services

Temporary Down-Hole Liner is made of heavy gage rubber hose of greater diameter than the well casing. It is stretched lengthwise on a special setting tool, which reduces liner diameter sufficiently so it may be lowered by wire line to proper depth. There, liner is released, and it tries to return to its normal diameter, the resulting pressure-fit sealing off that particular section of perforations, so fluids cannot penetrate from well-bore. Surface tests of 4,500 psi across ¾-inch perforations resulted in no burst and no leaks. Pump through tests of 30 bpm through a 10-foot liner in 5½-inch casing resulted in approximately 15 psi drop and no movement of liner.

For more data on above item, circle E414 on postcard, Page 243

Servco Company

Expanding Hole Opener available in rock bit or blade types, is run through casing to enlarge the hole for gravel packing, cementing, landing casing or liners, wall scraping, or for any purpose where larger hole diameter is desired. Rock Bit Type enlarges drilled hole up to twice drilled diameter in soft or hard formation. Drills in same manner as a rock bit. Blade Type opens drilled hole to larger diameter simultaneously with the drilling operation, in soft to medium hard formations. Full fluid flow passes through jets of standard bits. Hole size can be increased to approximately ¼th greater than drilled hole. Blades are dressed with Servcoloy "W," a special tungsten carbide dressing material which greatly extends blade life, assuring a gaged hole. Features: pressure indication at surface when tool is open, full volume circulation, and choice of fluid flow (whether substantially through pilot or entirely through cone recesses). Blade Type available with 10-inch diameter body and 15-inch reaming diameter for use in 12-inch diameter hole. Rock Bit Types available in various diameters.

For more data on above item, circle E415 on postcard, Page 243

Servco Taper Mills, used to mill out collapsed casing, to enlarge holes through adapters or retainers, to mill out a dented or mashed area of casing, and

See how simple and positive it is to make a BAKER SNAP-SET DUAL COMPLETION

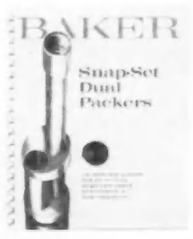
What makes a simple and positive dual-string hookup possible is the fact that a better upper retrievable packer is now available. It is Baker's remarkable new Snap-Set Dual—and it's made in two models, one long-string set, the other short-string set.

Designing a good upper retrievable packer is a big order. A dual packer must hold from above or below—even under extreme conditions of temperature and pressure—and for as many months or years as may be required. It also must release easily when you want to reposition or retrieve.

Other requirements are equally important. Is the packer easy to set and release? Is spacing out simple? Can packers be tested before displacement? Can mud be displaced and zones washed while flanged up? Is there provision for simplicity of workover? For artificial lift?

Do Baker's new snap-set duals satisfy all of these requirements? They do. The important thing is that they do it with clean simplicity of design. Simplicity and reliability go together in a Baker Snap-Set Dual Packer.

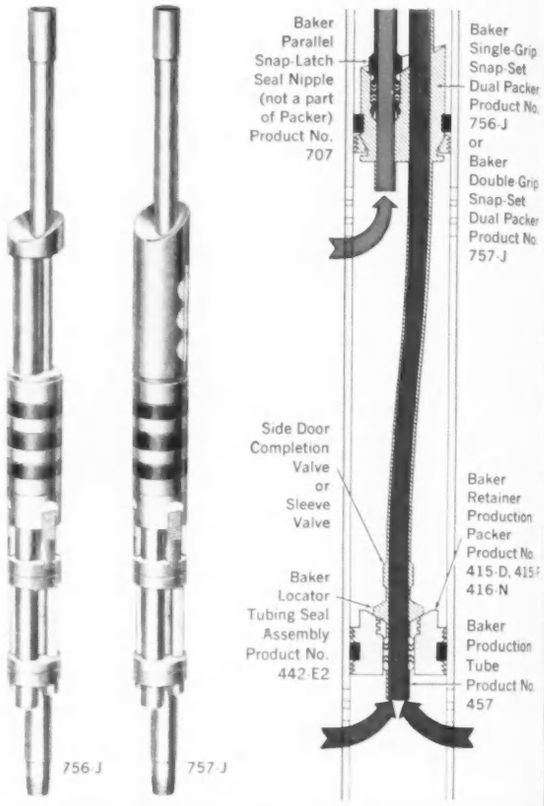
BAKER

SNAP-SET DUAL PACKERS

48 PAGES OF FACTS

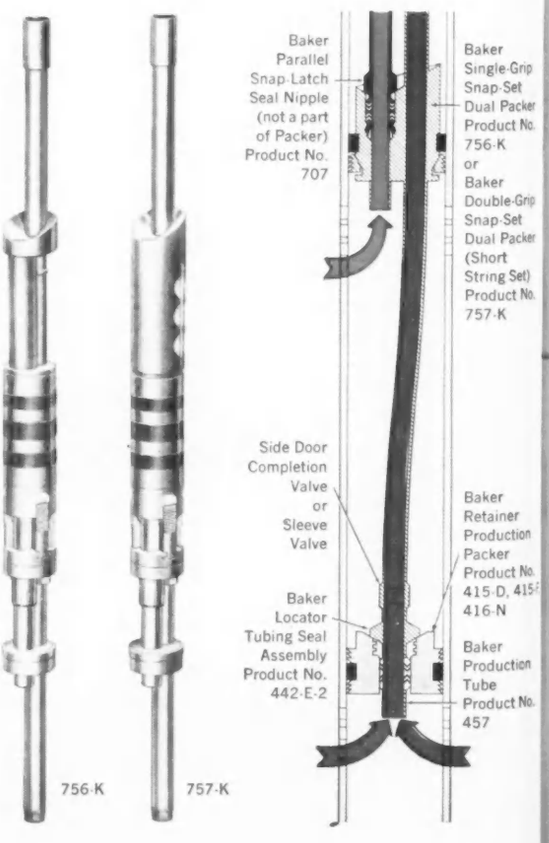
With big pictures and few words, a new brochure tells the interesting engineering story behind Baker's new Snap-Set Dual Packers. Your Baker representative has this story or write to Baker Oil Tools, Inc., P. O. Box 2274, Terminal Annex, Los Angeles 54, California.

BAKER OIL TOOLS, INC.
HOUSTON / LOS ANGELES / NEW YORK

MODEL J IS LONG-STRING SET.


Baker Parallel Snap-Latch Seal Nipple (not a part of Packer) Product No. 707
Baker Single-Grip Snap-Set Dual Packer Product No. 756-J or Baker Double-Grip Snap-Set Dual Packer Product No. 757-J
Side Door Completion Valve or Sleeve Valve
Baker Retainer Production Packer Product No. 415-D, 415-F 416-N
Baker Locator Tubing Seal Assembly Product No. 442-E2
Baker Production Tube Product No. 457
756-J
757-J

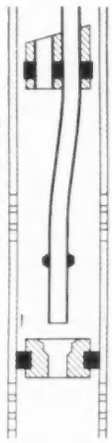
MODEL K IS SHORT-STRING SET.


Baker Parallel Snap-Latch Seal Nipple (not a part of Packer) Product No. 707
Baker Single-Grip Snap-Set Dual Packer Product No. 756-K or Baker Double-Grip Snap-Set Dual Packer (Short String Set) Product No. 757-K
Side Door Completion Valve or Sleeve Valve
Baker Retainer Production Packer Product No. 415-D, 415-F 416-N
Baker Locator Tubing Seal Assembly Product No. 442-E-2
Baker Production Tube Product No. 457
756-K
757-K

You've set the lower Baker Retainer Production Packer. Now you're ready to set the upper packer, to run the short string, and to bring both zones into production. These seven pictures show how simple it is to do that, using a Baker Model J Snap-Set Dual Packer.

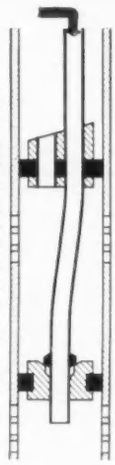
1

RUNNING IN
Made up on long string are Model J upper packer and lower-packer sealing accessories.



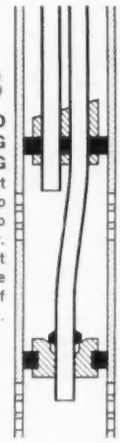
2

SETTING UPPER PACKER
When sealing accessories "locate" in lower packer, set-down weight on long string sets and packs off Model J Packer. Repeat setting simplifies spacing out. Now test lower packer if desired.



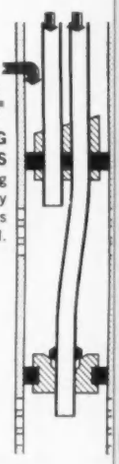
3

RUNNING AND INSTALLING SHORT STRING
Seal on short string "snap latches" into upper packer. Pull back to test for surface indication of seating.



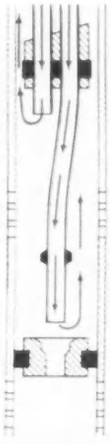
4

TESTING PACKERS
Pack-off tubing at surface; apply pressure as indicated.



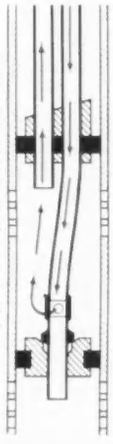
5a

DISPLACING WITH TUBING PACKED OFF
Pick up and displace both strings. Set back down with set-down weight to pack off packers and produce.



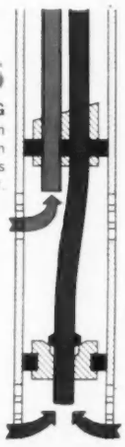
5b

DISPLACING FLANGED-UP USING CIRCULATING OR COMPLETION VALVES
If displacing with head on, as in 5a, or flanged-up, as in 5b, isn't required, there are other options.



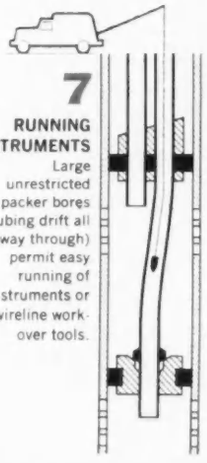
6

PRODUCING
Now you're on production through packers that really hold.



7

RUNNING INSTRUMENTS
Large unrestricted packer bores (tubing drift all the way through) permit easy running of instruments or wireline work-over tools.



Hold-downs on Double-Grip Version

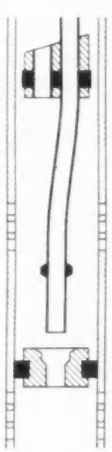
A reminder

Both Model J and Model K are available in single-grip or double-grip versions. Double-grip versions will permit pressuring operations later without having to pull packers.

Most Model K hook-ups use the Baker Retainer Production Packer at the bottom, but Model K does permit you to run another retrievable packer at bottom if you want to. It also permits you to keep the long string in natural tension if desired. The pictures demonstrate the simplicity of a Model K dual completion.

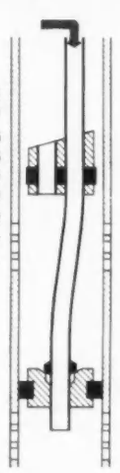
1

RUNNING IN
Made up on long string are lower-packer sealing accessories and Model K upper packer.



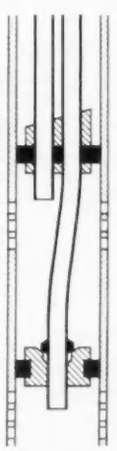
2

SEALING ACCESSORIES LOCATED IN LOWER PACKER
Now test lower packer if desired.



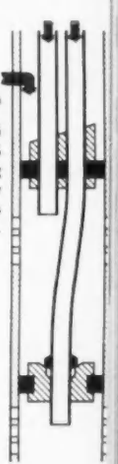
3

INSTALLING SHORT STRING AND SETTING PACKER
Seal on short string "snap-latches" into sealing bore. Weight set down on short string sets and packs off packer. Repeat setting simplifies spacing out.



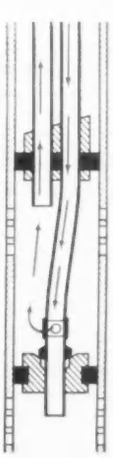
4

TESTING PACKERS
Pack-off tubing at surface; apply pressure as indicated.



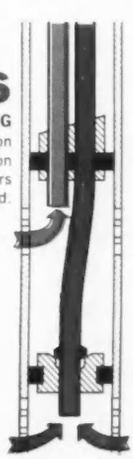
5

DISPLACING FLANGED-UP USING CIRCULATING OR COMPLETION VALVES
If displacing flanged-up isn't required, there are other options. Picking up and displacing both strings is a method for Model J only. (See 5a above.)



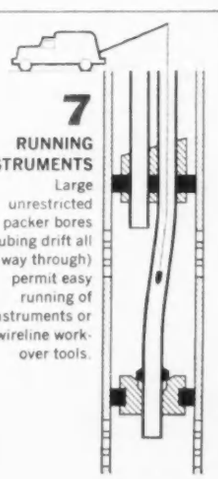
6

PRODUCING
Now you're on production through packers that really hold.

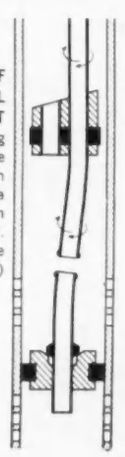


7

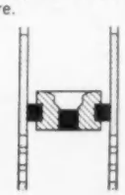
RUNNING INSTRUMENTS
Large unrestricted packer bores (tubing drift all the way through) permit easy running of instruments or wireline work-over tools.

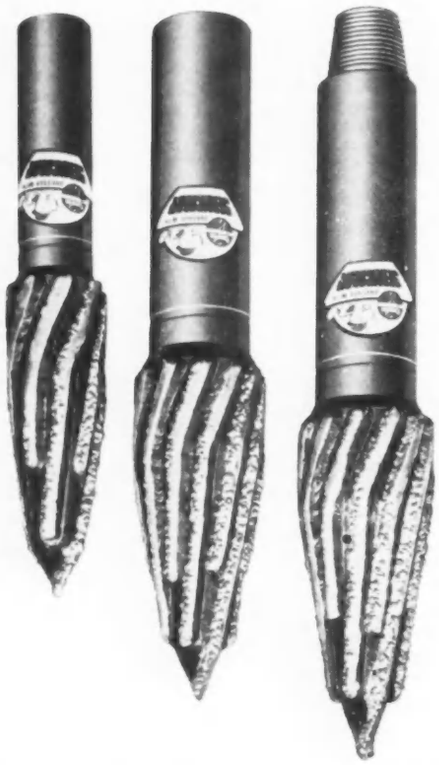


USE OF OPTIONAL SAFETY JOINT
Because the long string can be rotated through Model K, a safety joint can be run if desired. (Cannot be done with Model J.)



OPTIONAL EXPENDABLE PLUG
Prior to running upper Model K packer, you can run a Baker Expendable Plug for upper zone work-over. Plug is knocked out when long string enters packer bore.

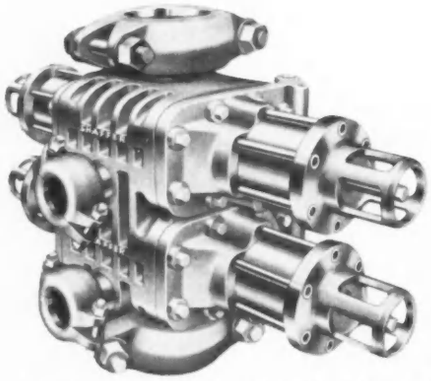




with permanent whipstocks to clean out and remove burrs from windows, have been redesigned for greater cutting efficiency. Taper Mills are dressed with Servcoloy. This new patented method of utilizing tungsten carbide in drilling, milling and fishing tools makes possible phenomenally fast cutting speeds. By suspending bits of carbide in a tough, elastic matrix, hundreds of cutting edges are always in contact with the surface to be cut. As particles are worn or torn away, new cutting edges are automatically exposed.

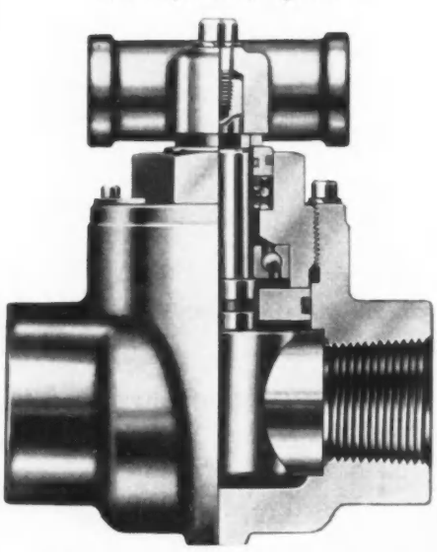
For more data on above item, circle E416 on postcard, Page 243

Shaffer Tool Works



Shaffer Lightweight "LWS" Blowout Preventers provide all the pressure-handling capabilities of equipment now in use, but weigh approximately half as much. Example: API 6-inch Series 1500 Shaffer Type "LWS" Preventer (5,000 psi Working Pressure—10,000 psi Test Pressure) with 7⅛-inch bore weighs only 2,610 pounds, up to 55 percent saving in weight without any loss in performance, dependability or operating features. "LWS" Preventers include "Swinging End-Opening" Doors for making ram changes without loss of fluid or breaking hydraulic lines, "In Line" Power Drives for positive ram operation without multiple linkages, levers or other complex connections, completely enclosed design with no exposed operating parts. Available in both "Single" and unitized "Double" Gate designs, with wide choice of outlets, and with studied, flanged or clamp-ring connections, Shaffer "LWS" Preventers are available in a wide range of bore sizes and pressure ratings.

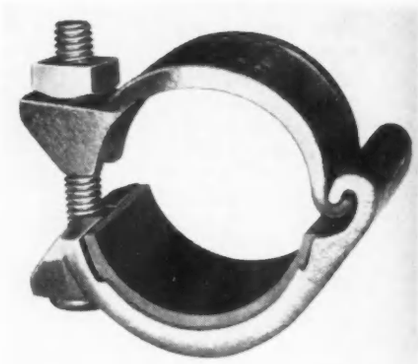
For more data on above item, circle E417 on postcard, Page 243



Shaffer-Tanner Plug Valves require no lubrication, feature unique "sealing ring" design. Hardened steel sealing ring around both inlet and outlet ports assures leakproof seal without need for tight fit around entire plug and body areas. Thus, friction and maintenance are reduced to a minimum, no complicated grease channels are required, plug does not "freeze" in the body under high pressures. Plug rotates on friction-free ball thrust bearings that are lifetime lubricated at the factory. Also, an adjusting nut, protected by a lock plate, is built in to permit quick adjustment for the exact turing characteristics desired on each application—higher resistance where vibration is a problem (such as on cementing trucks and similar portable applications), lower resistance where pulsation problems are negligible. Valves operate freely from —32°F. to +225° F. Available in sizes from 1-inch to 4-inch, for handling working pressures as high as 10,000 psi, and in choice of screwed or Flanged connections.

For more data on above item, circle E418 on postcard, Page 243

M. B. Skinner Company



Junior Emergency Pipe Clamp is made up in single bolt width, instead of two bolt width, and is only 2⅞ inches wide. It is made of malleable iron, has a full length hinge along one side, single oversized plated bolt on the other. The top half is a little narrower than the bottom or gasket half of the clamp. New feature—the lug on the gasket half is slotted for quick bolting. This makes it far more simple to apply than a "band" clamp. Recessed pressure-equalizing gasket, covering entire bottom half of clamp, is cemented in. Installation is quick. Just place the narrow or top half of clamp on pipe opposite leak. Then hook the wide gasketed half on the hinge. Press wide gasketed half against the leak, and bolt will automatically fall into place. Tighten nut and the job is done.

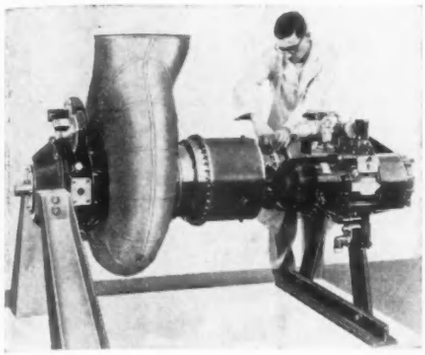
For more data on above item, circle E419 on postcard, Page 243

Stewart & Stevenson

Small, Lightweight Sand-Fluid-Blender, with mixing capacities up to 75 bpm of fluid with maximum sand ratios, is fully automatic with centralized controls. In the roading position, blender tank is elevated by a small winch. To feed unit with sand, it is only necessary to back sand dumper or transporter up to the tank. Sand enters a metering device which is automatically controlled by feed pump drive system. Unit will deliver automatically a fixed sand-fluid ratio regardless of blending rate. Also, sand-fluid ratio may be varied while blending a simple adjustment of a calibrated dial. Variable sand-fluid ratios range up to 8 pounds per gallon. Can be built in a large variety of capacities, and furnished on trucks, trailers or skids. Metering equipment for chemical additives is optional.

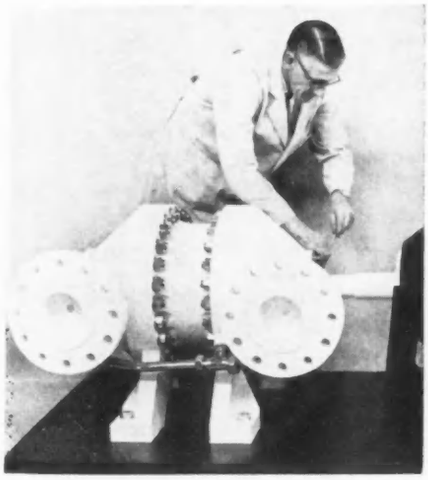
For more data on above item, circle E420 on postcard, Page 243

Solar Aircraft Company



Saturn T-1000 Gas Turbine Engine weighs 1,200 pounds and produces 1,100 horsepower. Engine occupies only 51 cubic feet and runs on diesel fuel and natural gas. New turbine has a simple cycle specific fuel consumption of 0.63 lb/hp-hr and a thermal efficiency of 22 percent. It is built in both constant and variable speed versions. Applications include power sources for generator sets, boat propulsion engines, and compressor and pump drives.

For more data on above item, circle E421 on postcard, Page 243

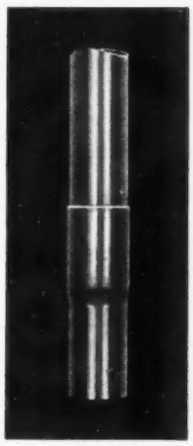


Solar Centrifugal Gas Compressor has been developed for use with gas turbine engines. Will operate from 75 to 1,000 inlet cubic feet per minute at up to 1,500 pounds of pressure, a range formerly limited almost exclusively to reciprocating compressor equipment. Lower initial cost, greater reliability and low cost maintenance. Compressor may be driven by Solar's Saturn T-1000 gas turbine engine, which produces 1,100 horsepower. Total weight of compressor and engine, approximately 6,000 pounds. Designed for high rotating speeds from 15,000 to 25,000 rpm to match rotating speeds of gas turbine driver. This allows direct coupling of compressor and turbine and eliminates need for reduction gearing. Higher compressor speeds mean that smaller inlet volume flows can be compressed at high efficiency. Has a "family" of interchangeable compressor wheels, which cover the compression and horsepower range. This permits field changes in the compressor to handle new flow and pressure conditions without changing complete units.

For more data on above item, circle E422 on postcard, Page 243

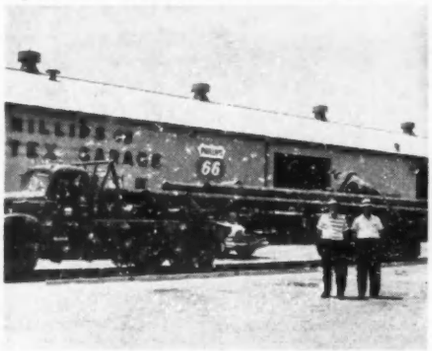
Southwestern Pipe, Inc.

SPA 190 Integral Joint Tubing is available in sizes up to and including 3½-inch OD casing. This tubing is quality-engineered for more economical slim hole and multiple completions. Recessed box for easier stabbing and greater resistance to hoop stress induced by make-up is one of the features. Laboratory pull tests prove joint efficiency to be much greater than theoretical (calc.). It is interchangeable with 10Rd. API non-upset tubing and is manufactured to conform to applicable parts of API 5A standards. Multiple hydrostatic, shock and crush tests assure completely sound welds and true dimensional wall thickness. Make and break tests far in excess of normal well servicing indicate excellent gall resistance.



For more data on above item, circle E423 on postcard, Page 243

Spencer-Safford Loadcraft



JT-608-05 Spl. Oil Field Trailer does the work of two units, a regular oil field float and a pole trailer. Normal length is 30 feet, but by extending one end of the bed with special telescoping pipe frame it stretches out to 40 feet to haul longer materials. Unit uses six-inch diameter heavy-duty, double-telescoping pipe extensions. Entire front three feet of the trailer moves forward into extended position—kingpin, plate, pickup nose, and all. Length can be extended and locked by a simple hole-and-pin arrangement at any position up to 10 feet. Extension and semi-automatic locking is simple one-man operation. Trailer's versatility means half as many license plates to buy, half as many operators to pay, fewer tires wear out, less gasoline, maintenance, and other operational costs.

For more data on above item, circle E424 on postcard, Page 243

Sprayaway Corp. of America

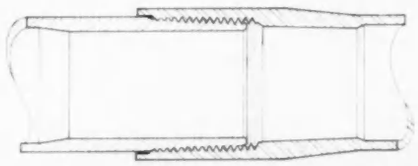
High Pressure Thermadraulic Chemical Spray Washing System for use on oil field equipment is specially designed instant heater combined with 100-gallon chemical tank reservoir and high pressure pump system. Unit is portable and may be used in field or shop. For field use, unit is propane fired and equipment is mounted on heavy duty I-beam skid. For shop locations, it is natural gas fired and employs a heavy duty electric motor to power the pump. Application of heated chemical spray under high pressure has proved effective in cutting grease and oil deposits encountered in oil fields. It has been tested successfully on such equipment as drilling rigs, pulling units, pumping units, tank batteries and many other types of stationary equipment.

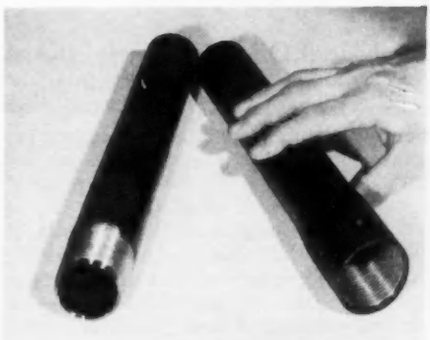
For more data on above item, circle E425 on postcard, Page 243

The Standard Tube Company

Oil Well Casing and Tubing, manufactured under API approval, are available in various sizes and strengths. Tubing sizes include 2⅜-inch and 2⅞-inch with external upset and 2⅜-inch and 2⅞-inch non-upset; these are manufactured in two strengths, J-55 and H-40. Casings are available in the 4½-inch size in both J-55 and H-40 grades. Standard maintains complete facilities for threading, upsetting and testing tubes according to API specification 5-A. All tubing and casing produced will be API monogrammed.

For more data on above item, circle E426 on postcard, Page 243





Macaroni Sizes of Electric Welded Tubing are available in ¾, 1, 1¼ and 1½-inch nominal IPS sizes, 2-1/16-inch

OD macaroni tubing is also available in 1½-inch IPS size with a 0.125-inch wall thickness. Various types and sizes of macaroni tubing listed are available in J-55, H-40 and F-25 grades with plain, non-upset and upset ends in accordance with API standards where applicable. Most sizes are also available with integral box and pin type joints. All macaroni tubing manufactured by Standard Tube is full length normalized and 100 percent eddy current tested.

For more data on above item, circle E427 on postcard, Page 243

P. A. Sturtevant Company

TM 2000 Torque Multiplier Wrench Adapter makes it possible to use a single torque wrench with lever length of only 30 inches for applications of 300, 600, 900, and up to 1,500 foot pounds. Tool is relatively light in weight for ease in handling, small in size for ease in shipping and carrying, and universal in that a single torque wrench can take the place of three conventional type torque wrenches. Torque wrench is exceptionally versatile in that a combination of various box end openings regular drive square or ratchet heads are available and may be interchanged whenever necessary.

For more data on above item, circle E428 on postcard, Page 243

Tex-Tube, Inc.

Series 500 Joint offers a rapid, low-cost method of joining steel line pipe. It uses a bell-joint, epoxy adhesive and a crimping tool. Epoxy adhesive is applied to the mating surfaces before they are joined. The hydraulic tool crimps the joint to hold it firmly together while epoxy sets. Pipe can be layed and covered immediately and the joint reaches maximum strength in about 48 hours. Field tests over a 12-month period have proven the joint's performance. Pipe is layed rapidly and permanently, and prevents internal joint corrosion. Installation time and cost are also reduced over welded installations. Available on sizes 1½ to 4½ inches. Test pressures are 1,200 psi for 1½ through 3½ inches and 800 psi for larger pipe. Research is expected to increase future working pressures to yield strength of pipe.

For more data on above item, circle E429 on postcard, Page 243

Technical Oil Tool Corporation

Drilling Recorder records drill string weight, rate of penetration and torque or pump pressure simultaneously. First practical, complete well logging instrument of its kind. All operations are recorded on one permanent chart. Hydraulic system provides readings, in thousands of pounds, on total suspended drill string weight, weight on bottom and changes in weight. Time elapsed for each foot drilled, number of feet drilled per hour, drilling and non-drilling time are measured mechanically. Drilling Recorder also determines torque, which pin-points tight spots in hole and indicates locked cones. As an alternate to torque record, the hydraulic system can be used to measure pump pressure. Enables drilling contractors to compute time, and oncoming drillers can use chart to guide their tours and record details of drilling progress. Drilling Recorder simplifies record keeping and provides an accurate check on formation changes and drilling breaks.

For more data on above item, circle E430 on postcard, Page 243

Densometer and Pitometer, developed by Halliburton Oil Well Cementing Company, is marketed in U. S. by TOTCO. Densometer and Pitometer combine to form a fluid-analysis system that provides an accurate, continuous check on fluid density and level during drilling operations. A chart recorder for the new fluid-analysis system can be mounted immediately adjacent to the control console for easy reference by the driller. New system has proved its value and reliability over months of testing in the laboratory and in the field.

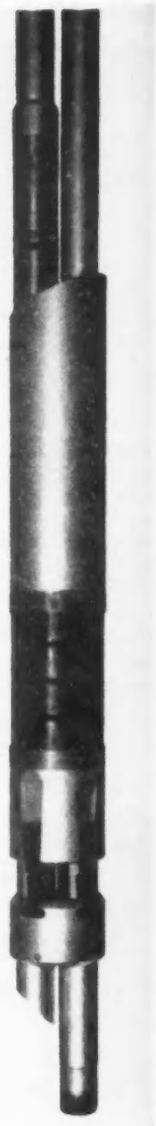
For more data on above item, circle E431 on postcard, Page 243

Texas Iron Works

T-I-W Type C Snap Lock Packer is a simple compression type packer designed for use as upper packer in two-packer well setting. It may be used in dual completion wells, with a single tubing string, including cross-over flow; or it may be used to blank off a hole, or perforations in casing above lower packer. Lock Packer provides a number of features, including large by-pass area for ease of running in the hole. Can be set, released and re-set without coming out of hole; no rotation of tubing or pressuring is required to set. Simply set down weight. Can be furnished with hold-up slips, to limit weight set on lower packer; hold-down slips, to withstand pressure below packer; or is available with both hold-up and hold-down slips. Lock Packer has no shear pins, and is easily retrievable by picking straight up on tubing.

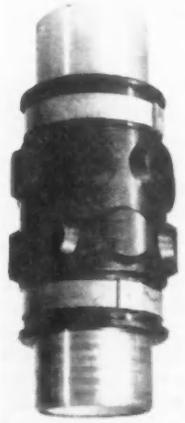
For more data on above item, circle E432 on postcard, Page 243

T-I-W Snap Lock Series of Multiple Packers have been providing excellent performance from field tests during past year. Packers can be set, released and re-set without coming out of the hole, due to use of snap lock collet instead of shear pins. Three outstanding features of packer are: cannot be preset by running into obstructions, going in the hole; has especially designed, contoured, pack-off rubbers which require less weight to effect pack off; has dovetail slips for positive setting and easy releasing. Packers can be furnished to be set with long string or short string, and is completely retrievable with the long string. Can be furnished with or without hold-down slips, and with variety of latching devices on the seal nipples, such as snap type, jay type, etc. All parts are "gage made" for interchangeability of parts.



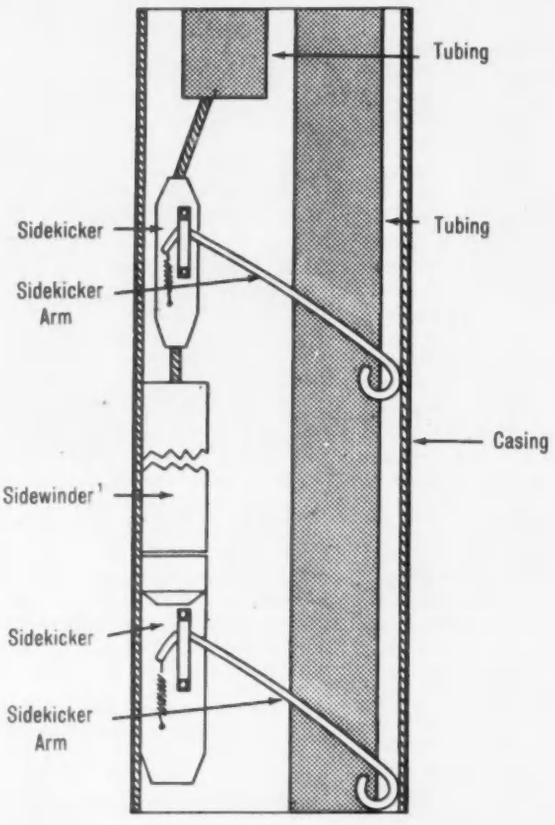
For more data on above item, circle E433 on postcard, Page 243

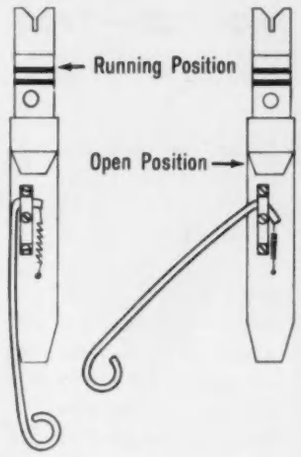
T-I-W Tubing Centralizer for use in tubingless completion is designed to enable the operator to run multiple strings of tubing, individually, and maintain proper annular spacing of tubing to insure optimum cementing conditions. Made of molded synthetic rubber, centralizer is quickly and easily positioned on tubing string, and firmly held in place by metal bands. Spacing buttons are arranged for maximum circulation with minimum "channeling" of the cement. Designed for maximum efficiency at minimum cost.

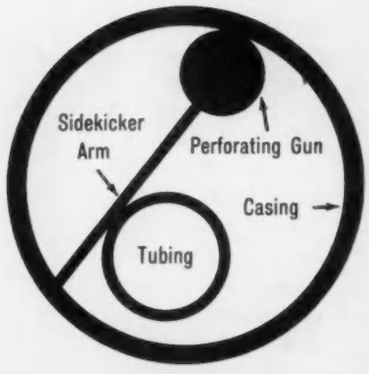


For more data on above item, circle E434 on postcard, Page 243

Revolutionary New Completion Service







Sidekicker Solves Dual PWC* Problems

* **Permanent Well Completions**

Welex engineers have answered the problem of perforating an upper zone with no risk to the adjacent tubing string in dual permanent well completions. The new development — another first by Welex — offers these advantages:

- Service can be performed through 2″ tubing and standard seating nipples.
- The Sidekicker, a mechanical orienting decentralizer developed by Welex, forces the Sidewinder[1] perforating gun against the side of the casing, assuring maximum penetration.
- The Sidekicker positions jet gun so that the charges will fire outward through the casing — never in the direction of the adjacent tubing string.
- Sidewinder[1] retrievable carrier absorbs the shock of detonation, protecting adjacent tubing string from damage.
- Absolutely no debris is left in the hole. All debris is retained in the carrier and returned to the surface.

Welex, the company that originated jet perforating proudly adds this new service to the other "firsts" that it has introduced to the oil industry.

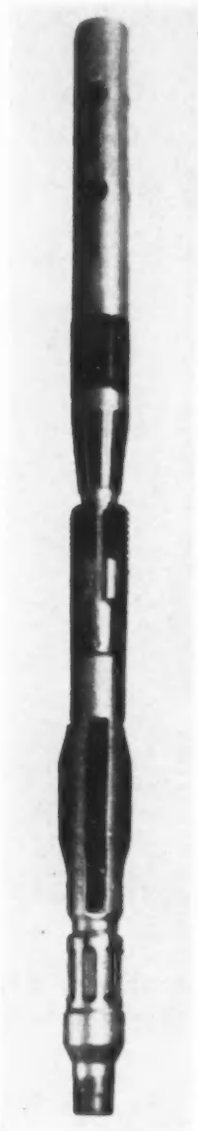
In Permanent Well Completions, as well as in other types of completions, Welex has a complete set of tools for every job. Next time and every time let Welex's completion services work for you.

WELEX, INC

ORIGINATORS OF Welex JET PERFORATING

General Offices: 1400 East Berry, Fort Worth, Texas
In Canada: Welex of Canada, Ltd.

[1]*Trademark of Jet Research Center, Inc.*

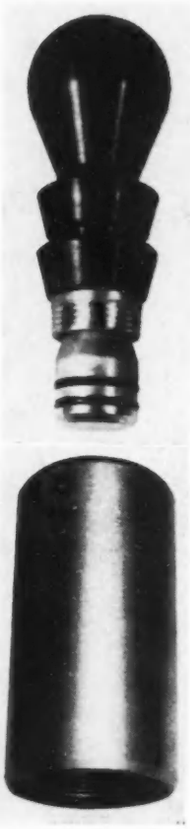


T-I-W Type AH Packer has been designed for use in both conventional and "tubingless" well completions where small sizes of casing and/or production tubing is used. Recommended for use in drillstem testing, tubing testing, single and dual zone completions, permanent-type completions, hydraulic fracturing, acidizing and squeezing, the new AH Packer features T-I-W Automatic Bottom, which eliminates left-hand rotation of tubing while setting or releasing. Packer also features one piece mandrel and ring type packing elements, for positive seal against high pressures. Can be set, released and re-set without affecting efficiency of packer, and is available for 2⅜ and 2⅞ OD casing, with or without hydraulic hold-down slips.

For more data on above item, circle E435 on postcard, Page 243

Tubing Guide Shoe for use in tubingless completion is made of a tough aluminum alloy which is sufficiently rugged to withstand impacts that may be encountered while running the tubing, yet is easily drillable if it becomes desirable to drill it out. Tubing Guide Shoe is designed for maximum efficiency at minimum cost.

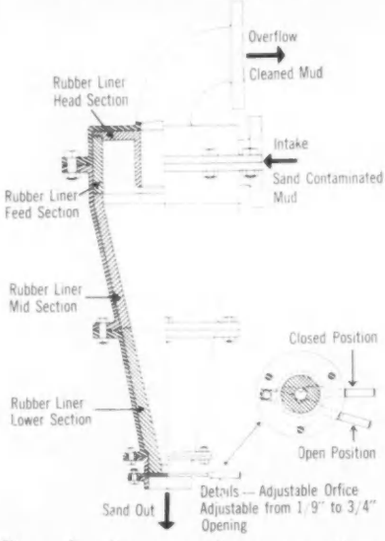
For more data on above item, circle E436 on postcard, Page 243



Tubing Wiper Plug and Landing Collar Assembly for use in tubingless completion is designed to insure the operator against faulty cementing jobs. Landing collar is placed in the tubing at a point where pressure seal is desired. After cement has been pumped into tubing, the wiper plug is placed in tubing and pumped down until it latches into landing collar. This gives a positive indication that the cement is spotted, the tubing is wiped clean, and pressure from either direction is sealed off. Field tested in numerous tubingless completion wells in West Texas, South Texas and Gulf Coast areas. Designed for maximum efficiency at minimum cost.

For more data on above item, circle E437 on postcard, Page 243

Thompson Tool Company



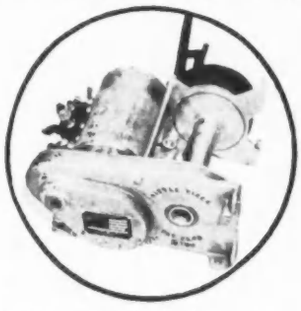
Desander keeps sand content of mud as low as ¼ of 1 percent, and saves mud and equipment. Features include: (1) Completely rubber lined 9/16-inch thick. (2) Adjustable discharge head speeds set up. (3) Discharge in desired direction for faster set up. (4) Quick cleanout. (5) Controls sand discharge with lever.

For more data on above item, circle E438 on postcard, Page 243

Mudmixer Automatic Feed and Mixer gives close control of dry muds and chemicals (except caustic soda) and mixer delivers mud to system thoroughly mixed. Actual field tests have proved an increase in jel yield of 15 percent to 30 percent over other mixing methods. Mud and Chemical Mixer is a complete unit with pump and power.

For more data on above item, circle E439 on postcard, Page 243

Tiger Manufacturing Company



"Big Tiger" Winch is a 2½ horsepower DC with lifting capacity of 2,000 pounds single line, 5,000 pounds multiple lines. Only weighs 60 pounds complete with control station. Line capacity is 450 feet of 3/16-inch cable. AC Universal 110 or 220 Motor also is available. Both Units are interchangeable with "Little Tiger" Winch. Units are ideal for use around rigs and for pickup and delivery trucks. Winch is versatile, portable, light weight and compact. Its strong castings, durability, optional manual or automatic electric brake are some of its outstanding features.

For more data on above item, circle E440 on postcard, Page 243

Trinity Portland Cement Div., General Portland Cement Co.

Trinity Lite-Wate Oil Well Cement is a low specific gravity, high surface area cement for oil wells. With nothing but the addition of water, Lite-Wate produces a slurry that ranges in weight from 12

A. P. I. CASING COUPLINGS

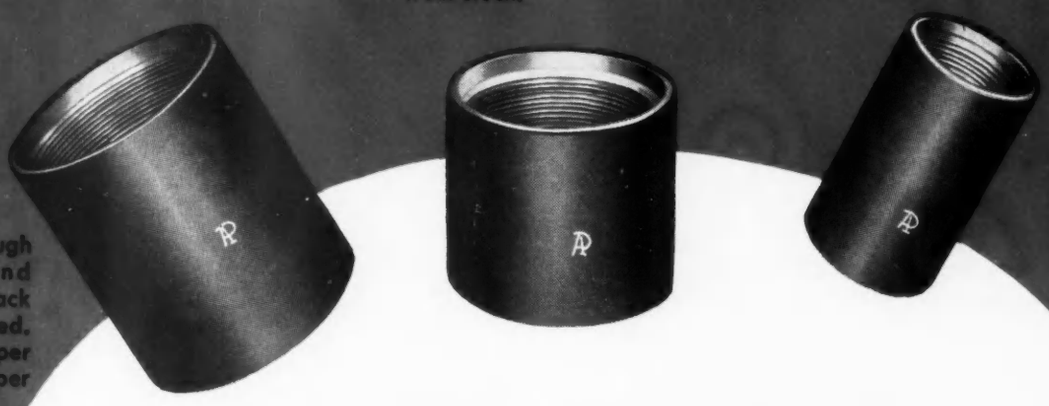
Short and Long, sizes 4½" through 13⅜". All threads 8 round, ¾" taper tapped per foot. Combination and sharp V thread casing couplings also available from stock.

A. P. I. TUBING COUPLINGS

Non-Upset sizes 1.900" through 4½". Upset sizes 1.660" through 4". Grades J-55, N-80 and P-105.

A. P. I. LINE COUPLINGS

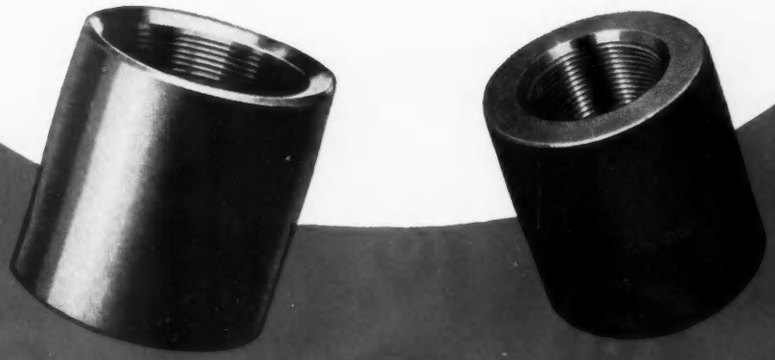
Sizes ⅛" through 2", 14" and 16" O.D. Black and Galvanized. Recessed, Taper tapped ¾" per foot.



ALL SIZES AND TYPES OF

COUPLINGS

FOR THE OIL INDUSTRY



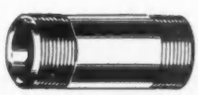
STANDARD MERCHANT

Black and galvanized. Sizes ⅛" through 6".

3000# and 6000# FORGED STEEL COUPLINGS

Manufactured to ASTM specification A-#105. Available in full and half couplings. 3000# sizes ⅛" through 4". 6000# sizes ⅛" through 3".

USE WITH THESE DEPENDABLE CAPITOL FITTINGS

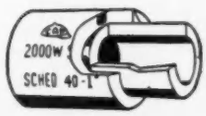


NIPPLES

UNIONS

SQUARE HEAD PLUGS

HEX HEAD PLUGS



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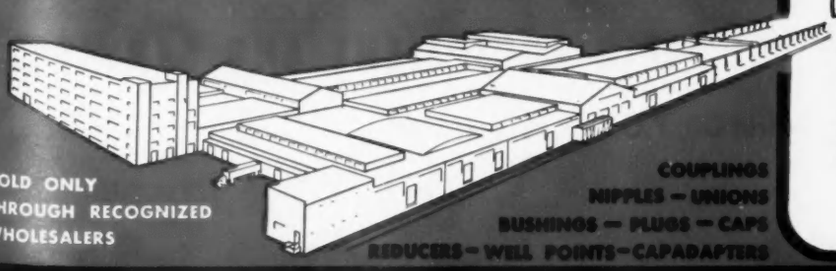
PRODUCERS OF QUALITY FITTINGS FOR MORE THAN 30 YEARS



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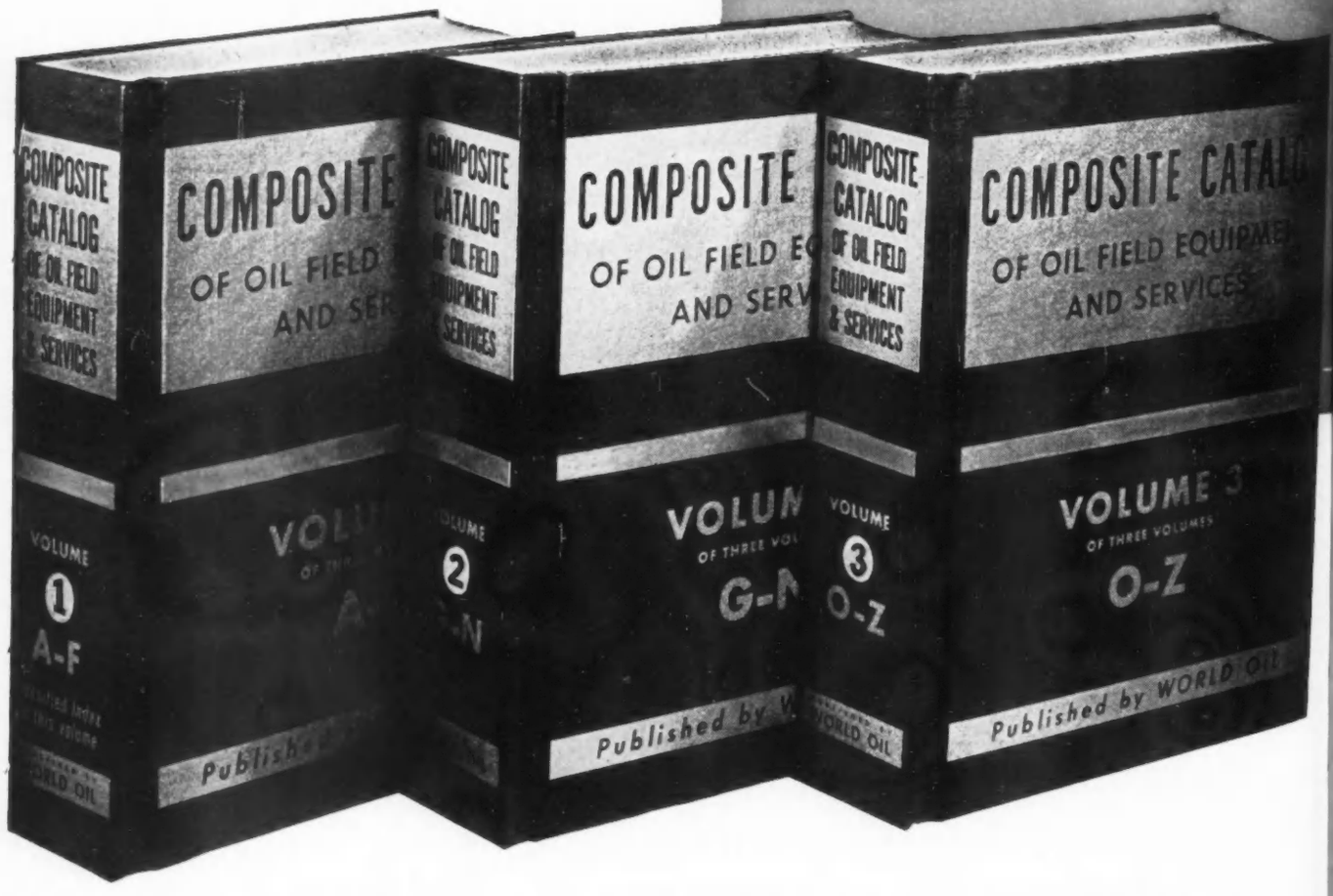

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J. D. Ball Wire Line Service Co.... ....TU 3-7762
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Klein-Deco Wire Line Service.....EM 9-6632
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ODESSA, TEXAS
John Kuykendall Wireline Service Co...FE 7-7210
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Rainbo Service Co.....ME 4-2131, ME 4-0105
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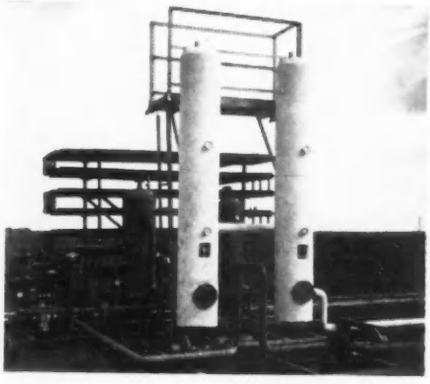
pounds to 13.6 pounds, light enough to circulate. Slurry is strong enough for any casing seat, strong enough to permit hydraulic fracturing, impervious to migrating fluids, and sulfate resistant for lasting casing protection. Every one of its more than 1,000 actual jobs has been a success.

For more data on above item, circle E441 on postcard, Page 243

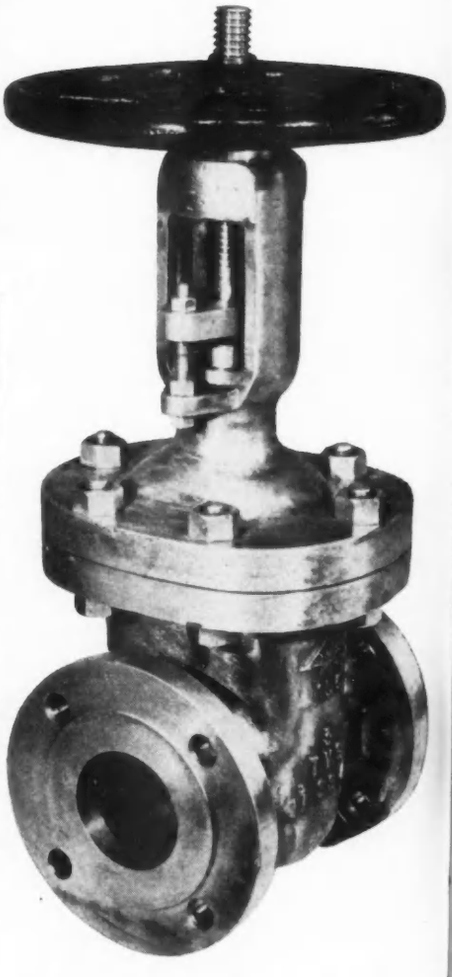
Tyson Smith Company



Short-Short Cycle Dual Bed Dry Desiccant Hydrocarbon Recovery Unit utilizes the full wellstream for cooling the bed of the regenerated vessel, providing shorter cooling stage, shorter total cycle for greater adsorption efficiency, improved utilization of adsorption bed for desirable hydrocarbon components, and secondary adsorption of displaced lighter components, resulting in higher percentage recovery of C_6, C_3 and C_4, and thus shorter payout of equipment and more revenue. Unit includes inlet separator—liquid receiver, two vertical adsorbers, salt bath indirect heater, atmospheric or forced draft cooler, tube bundle gas-to-gas cooler and condenser, is skid-mounted and unitized, and includes all valves and controls for automatic unattended operation. Unique for gas volumes ranging to 10 MMSCFD, unit dehydrates to maximum water content of 2 lb/MMSCF and, housed, is extremely adaptable to cold climate operation to secure 15° F and lower hydrocarbon dewpoint. Units designed for larger gas volumes utilize three or more beds to take advantage of principle described above.

For more data on above item, circle E442 on postcard, Page 243

Triangle Valve Company, Ltd.



Aluminium Wedge Gate Valves feature bolted bonnet; outside screw and yoke; spindle rising through handwheel; renewable seats; solid wedge; aluminium trim and bolting; ends flanged and drilled to A.S.A. classification; raised face serrated finish. Sizes 2 to 12-inches.

For more data on above item, circle E443 on postcard, Page 243

IDECO-WOODFIELD SHORTY BLOCKS WITH FABRIFORM SHEAVES

★ *Individually lubricated tapered bearings.*
★ *Cases are fabricated from plate steel.*
★ *Hinged sheave guards for faster reeving.*
★ *Safer, streamlined case; low centre of gravity.*
★ *Compact design gives up to 9 feet more headroom.*
★ *Tapered bearings keep sheaves in positive alignment.*
★ *Unitized block has automatic safety lock on hook and patented hydraulic metering device to give jarless stop in upward movement.*

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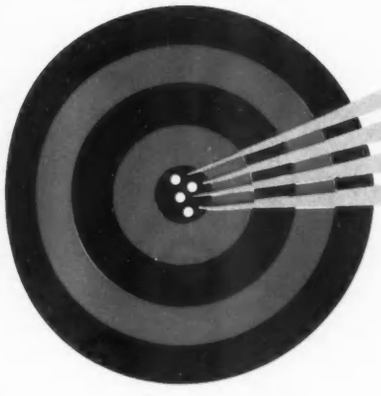

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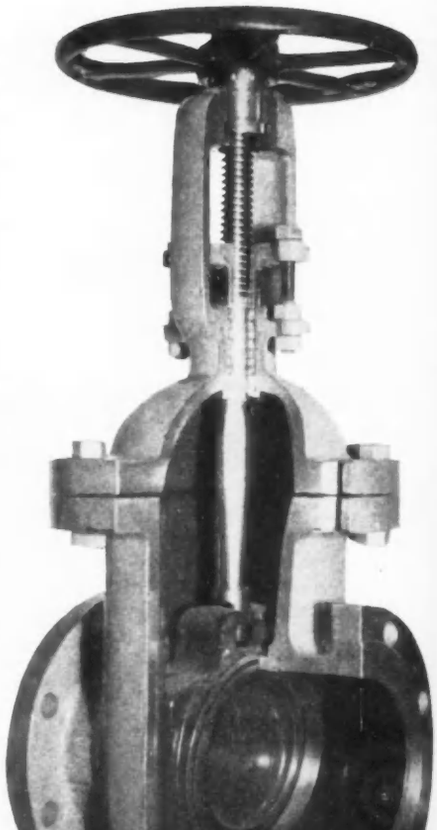
Cast Steel Wedge Gate Valve With Teflon Ring Insertion in wedge, is made in accordance with B.S.S. 1414, API 600-55, or S.O.D. 224 modified with wedge inserts. Conflicting requirements covered according to specifications on orders. Features: cast carbon steel body and bonnet with integral yoke, bolted body-bonnet connection, outside screw and yoke, stem rising through handwheel, suitable for repacking under pressure when fully open, 13 percent chromium steel trim, wedge faces fitted with renewable teflon inserts, ends flanged and drilled to A.S.A. B16.5 or B.S.S. 1560, raised face serrated finish (1/16-inch raised face for Class 150). Teflon (or other suitable plastic) ring fitted into each wedge face to provide a leak-proof seal in closed position. Rings are retained within a specially designed groove which prevents the ring becoming detached except for deliberate replacement. Small amount of ring protrudes above metal of wedge faces, thereby providing a resilient seal supported by a metal-to-metal contact of wedge and seat.

For more data on above item, circle E444 on postcard, Page 243



Triangle Cast Steel Through-conduit Pipeline Valve (Figure Nos. 18122, 38122 or 68122) is made in sizes from 6 to 36 inches for maximum cold working

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OIL MEN CONSULT

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pressures as follows: Class 150.275 psi, test pressure, 425 psi water; Class 300.720 psi, test pressure 1,100 psi water; Class 600.1440 psi, test pressure, 2,200 psi water. All tested 100 psi air with seat under water. Larger sizes are fitted with flange suitable for mounting standard actuators or bevel gears as in illustration. Also, if specified, valves are available with butt welding end.

For more data on above item, circle E445 on postcard, Page 243

Union Wire Rope Corporation, Subsidiary of Armco Steel Corp.

Hand Braided Casing Line Slings are available in 6 parts with a rated load of 3,600 pounds and 8 parts with a rated load of 3,000 pounds. Type 1 is a single legged choker sling with a 15-inch eye on one end and a choker hook and casing thimble on the other end. Type 2 is a double choker sling with a choker hook and a casing thimble on each end. Type 3 has a casing line thimble on each end without hooks.

For more data on above item, circle E446 on postcard, Page 243

Wire Rope, with UNI-CORE construction, has plastic core instead of fibre or wire. It is designed for special needs of oil well servicing such as sand lines for swabbing wells. Features include: greater ability to resist compression and elongation, two major causes of failure in other plastic cores; has much higher resistance to heat, principal cause of core failure; core is especially developed to resist acid and salt water deterioration.

For more data on above item, circle E447 on postcard, Page 243

Varel Manufacturing Company

V3S Soft Formation Three-Cone Rotary Rock Bit provides faster penetration rates, extra structural strength in the cones, and greater bearing life. V3S teeth are extra long and carefully spaced with ample deletions and clearances to

1260 horsepower to put where you please

The Ruston skid-mounted 'TA' gas turbine is the lightest long-life power package ever!

Here's a rugged lightweight unit for pump, compressor, or generator drive . . . 1260 reliable horsepower available two minutes after pressing the starter button. All the auxiliaries are mounted on the skid and the complete air-cooled unit weighs only 18,000 lb.

Whether mounted on a drilling platform or sitting on only 6" of concrete, this Ruston 'TA' will run unattended in conditions from Arctic cold to tropical heat . . . existing installations show that overhaul periods are way over 10,000 hours.

The skid-mounted 'TA' is a new concept in packaged power . . . the kind of lightweight heavy-duty unit oilmen have been waiting for. Write to Rustons to learn how it can help you.

. . . PLUS FREE HEAT!

'TA' exhaust heat can produce:

50,000 gallons of distilled water daily.

10,000 lb steam per hour.

12,000 gallons an hour of feed water for existing boilers.

RUSTON GAS TURBINES

430 and 1260 b.h.p. at 80° F. ambient temperature

RUSTON & HORNSBY LTD · LINCOLN · ENGLAND

Associated with Davey, Paxman & Co. Ltd., Colchester

provide maximum self-cleaning action. Optimum offset angle has been selected to provide the best skewing motion in relation to the deep gouging action of the teeth. V3S bits are available in sizes 7⅞-inch, 8¾-inch and 9-inch or regular circulation. Bit is designed to meet demands for higher penetration rates and lower cost per foot which require increased rotary speeds and heavier weights on bits.

For more data on above item, circle E448 on postcard, Page 243

VH2-G Three-Cone Rotary Rock Bit is designed for fast drilling in hard shale, slate, hard anhydrite, and limestones. Sizes are available in regular or jet for air or fluid drilling, including 7⅞, 8¾, and 9-inch. Chisel teeth drill with a chipping, crushing action with moderate twisting, tearing action for smoothest performance. Gage teeth have a reinforcing "L" in the machined teeth which are hard surfaced with "Varelloy" tungsten carbide in deep milled slots for longer wear and full gage in drilling medium hard formations.

For more data on above item, circle E449 on postcard, Page 243

PETOL
Alloy Cathead
CHAIN

PETOL TOOLS

For More Service With Safety!

The weld on each link bears the PETOL trademark—your guarantee of PETOL quality.

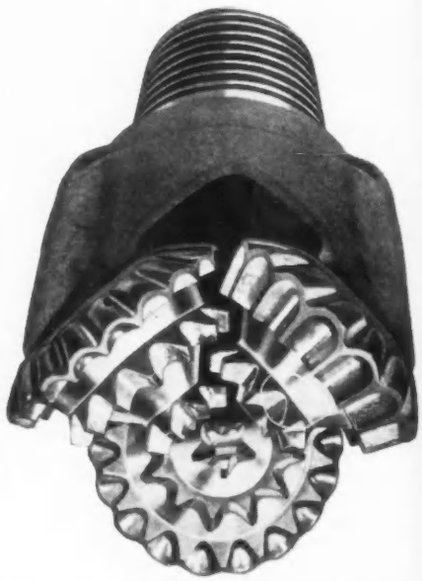
PETOL Alloy Cathead Chain offers the modern drilling rig the best chain available for use between tongs and cathead. Manufactured by the patented "X-Weld" process, it provides further safeguard for the crew by virtually eliminating the possibility of faulty link welds. It offers more than adequate strength with the PETOL safety feature of higher ductility for maximum elongation before failure in the event of accidental overloading. Links are shaped to allow attachment of spinning chain with or without use of a swivel.

GEARENCH MFG. COMPANY

MAIN OFFICE
P. O. Box 1221
Houston 1, Texas

EXPORT DIVISION
74 Trinity Place
New York 6, New York

VHI-C, a new hard formation rotary rock bit, is now available to the seismograph industry in 4¼, 4½, and 4¾-inch sizes. Cup-shaped teeth on the heel row of the bit provides faster penetration in hard formations. The bit is designed for



fast drilling in hard formations. Cup-shaped teeth have cutting action on the back and both sides. Center teeth are more rugged to withstand heavier weights which are used in formations with high compressive strength.

For more data on above item, circle E450 on postcard, Page 243

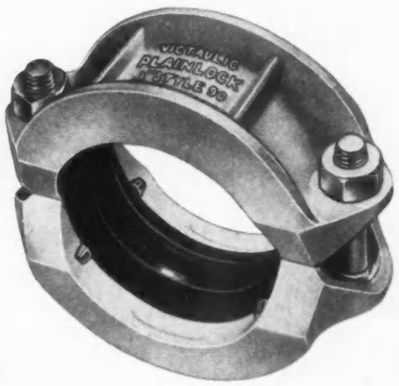
Vickers Incorporated, Tulsa Products Division

Lightweight Model 3 Winch solves many material handling problems. It has rated capacity of 4,000 pounds line pull and breaking point of approximately 9,100 pounds which enables it to be used in many tough assignments, yet is extremely compact. Versatile, it can be driven by power take-off, electric motor, hydraulic motor or by an internal combustion engine. It can also be operated

by hand through use of an optional hand crank. Safe, automatic band-type worm brake for hoisting work is optional. Features include: carefully machined one-piece alloy steel forged worm; bronze gear manufactured from highest quality nickel-bronze alloy; heavy duty ball bearings which never require adjusting; cable drum made of steel; drum shaft made of heat treated, ground and polished alloy steel, with a minimum yield point of 100,000 psi that is integral with drum; sliding clutch made from steel. Automatic safety brake, factory set to hold a suspended load equal to the rated capacity of the winch, is optional.

For more data on above item, circle E451 on postcard, Page 243

Victaulic Company of America

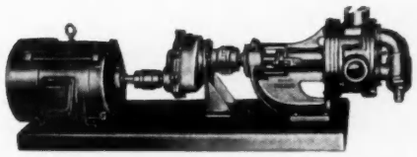


Plainlock Method of Piping affords simple, low cost and leak-tight method of connecting plain end pipe with positive-grip couplings and "Full-Flow" fittings. Plainlock Couplings, designed with two bolts for fast, easy installation, are fitted with hardened stainless steel grips that engage pipe ends and securely lock them together. An ordinary wrench with normal torque is sufficient to seat the grips in pipe or fitting ends. Use of Victaulic "Triple-Seal" Gaskets assures leak-tightness and long life. Couplings are ruggedly built for tough service conditions, yet are light in weight. Plainlock Fittings are engineered with long radii "Full-Flow" sweeps for good hydraulics and minimum friction loss. Ample wall thickness is provided for protection against corrosion and abrasion. Ends are specially designed for maximum gripping efficiency with Plainlock Couplings so that each fitting is securely locked to its adjoining piece. Fittings are available with plain ends or in combination of plain and other type ends for interconnection of other piping systems. Plainlock Couplings and Fittings are available in sizes 1, 2, 2½, 3, 4 and 6-inch.

For more data on above item, circle E452 on postcard, Page 243

Viking Pump Company

Heavy Duty Pumps, with helical gear reductions, offer range of speeds, permitting easy changing of pump speeds for handling thick or thin liquids. Gear ratios of 2.76:1, 3.40:1, 4.19:1; 5.06:1 and 6.27:1



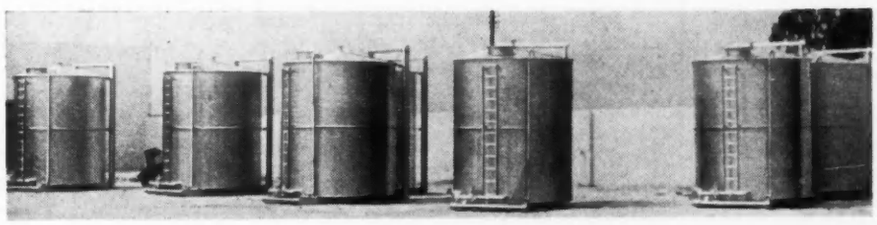
are available on units with 1,750 and 1,150 rpm motors. All five reducers are interchangeable. Pumps with 35, 50, 90 or 150 gpm capacity are mounted on an enclosed, formed steel base with motor and reducer. Maximum pressure which can be handled is 200 psi on lubricating liquids and 100 psi on nonlubricating liquids.

For more data on above item, circle E453 on postcard, Page 243

Braby OILFIELD EQUIPMENT

our range of products for the Oil Industry includes

GENERATING SETS
POWER HOUSES AND RIG UTILITIES
POWER PACKS AND TWIN UNITS
SELF PRIMING PUMPS UP TO 8"
DOG HOUSES AND TOOL HOUSES
FEED CONTROL SYSTEMS
WELDED AND SECTIONAL BOLTED TANKS
A.P.I. TANKS
SHALE SHAKERS
COMPLETE OILFIELD CAMPS
RIG AND CAMP LIGHTING SYSTEMS



A line of A.P.I. Tanks as supplied by Braby for use by an oil company in Libya.

Full Details on Application **FREDK. Braby & CO. LTD.**

OILFIELD DIVISION
BRABY HOUSE, SMITHFIELD STREET
LONDON E.C.1. ENGLAND

Phone: CENtral 2388
CABLES: XENOPHON CENT LONDON

MEMBER OF BRABY OF BRITAIN GROUP

Visco Products Company

Visco 1111, versatile new well treating chemical for reducing paraffinic-asphaltic, carbonate scale, sodium salt, and iron deposits in oil and gas wells, water-injection and salt water disposal systems, effectively disperses paraffin in tank bottoms. Material, when fed continuously in low dosages to water injection and brine disposal systems, steps up injectivity rates without calling for increased pump pressures. A blend of non-ionic, ethoxylated organics, Visco 1111 is shipped in 55-gallon non-returnable steel drums.

For more data on above item, circle E454 on postcard, Page 243

Filming Organic Corrosion Inhibitors, developed specifically for oil and gas well squeeze applications, show marked improvement over conventional batch-treating or continuous-feed inhibitors in that they have controlled solubility under well bore conditions. They usually furnish 3-12 month protection on one application. Effective against carbon dioxide, hydrogen sulfide, organic acids, and corrosive brines, they provide a persistent protective film on metal surfaces.

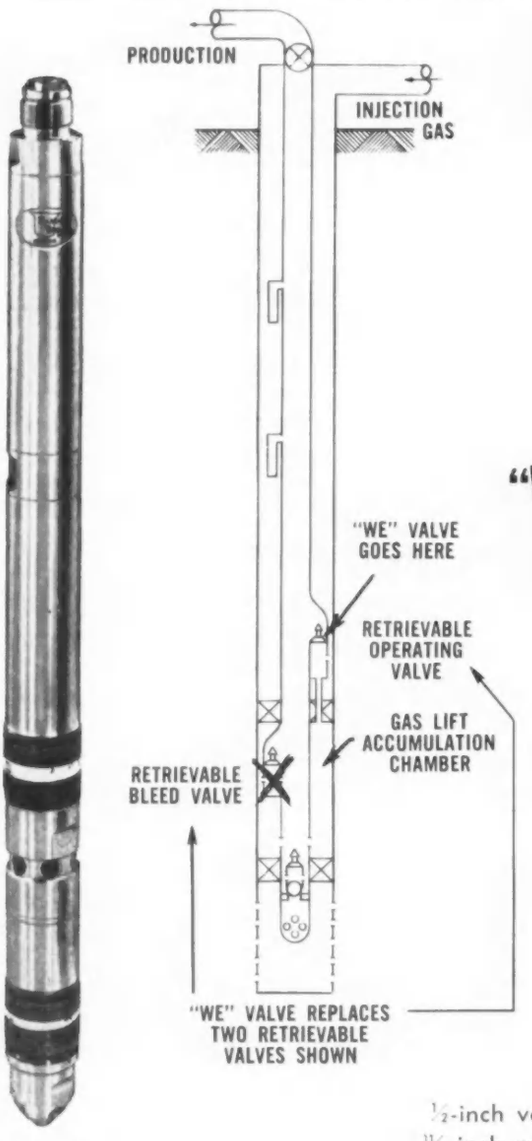
For more data on above item, circle E455 on postcard, Page 243

Henry Vogt Machine Company

Inside Screw Bolted Bonnet Forged Steel Valves are available in gate and

globe types (gate illustrated) for 150 to 800 psi service. They are of the inside screw stem, screw gland, bolted bonnet type and may be had with screw ends or socket weld ends, in ¼-inch through 2-inch sizes. All valves have forged steel bodies. Gate valve seats are expanded in the body and are easily renewable. Stellite or equivalent hard facing alloys are welded to the 13 percent chrome stainless steel seats. Other trims are available. Wedges are 13 percent chrome stainless steel hardened to 500 Brinell for maximum resistance to wear and erosion. Globe valves have hard faced integral seats and hardened discs. Stems are 13 percent chrome stainless steel. Stuffing boxes are extra deep and have one-piece forged steel packing glands. Bonnet studs are high-tensile alloy steel.

For more data on above item, circle E456 on postcard, Page 243



Pat. pending

NEW from H B

"WE" DUAL PURPOSE GAS LIFT VALVE FOR CHAMBERS

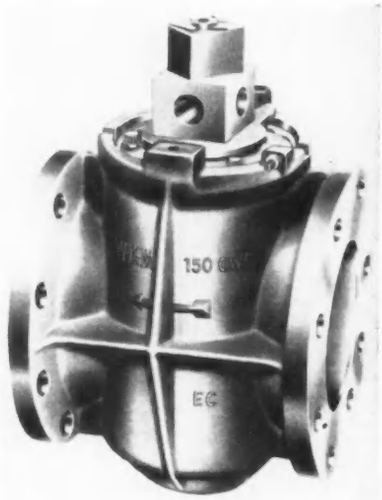
"WE" Valve vents accumulation chambers and serves as operating valve in gas lift installations . . . replacing both the vent valve and the lower gas lift valve in standard accumulation chamber installations. "WE" costs less than two valves and requires only one wire line trip to install or remove.

½-inch vent port
11/16-inch main port
Used in "MME" side pocket mandrels

Full information from

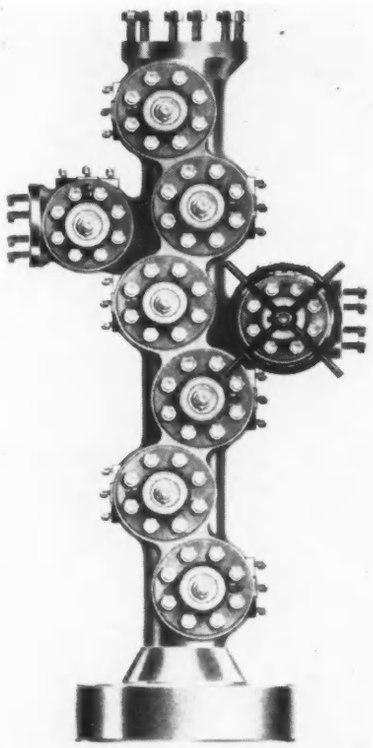
HAROLD BROWN COMPANY
P. O. Drawer 25047 • Houston 5, Texas
Phone JAckson 6-4411

W-K-M Division of ACF Industries, Inc.



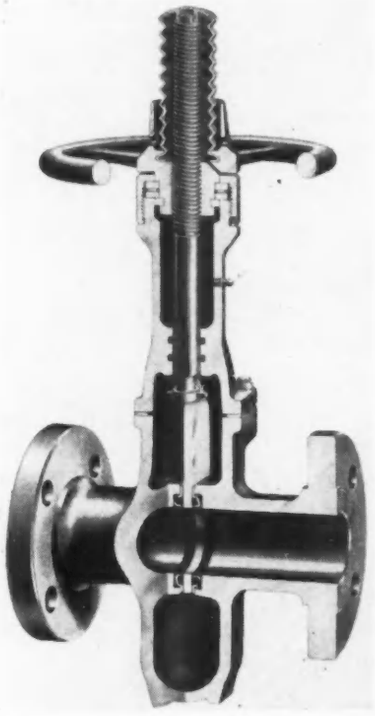
Eccentric Plug Valve is an extremely simple and compact valve which uses a quarter section eccentric plug and requires no lubrication. It is available in 150 WOG rating and in a range of sizes from ½ through 12 inches for a wide variety of services. The quarter section plug has an especially compounded rubber covering for maximum resistance to wear, and the eccentric facing provides a tight resilient seal. Other features include nickel alloy seating surfaces, wrench or worm gear operation, few parts and easy disassembly.

For more data on above item, circle E457 on postcard, Page 243



Composite Valves feature a series of master and wing valves for wellheads. Available in a variety of combinations and pressure ratings including a "Balanced Stem" for working pressures of 10,000 psi. All composite valve combinations have through conduit construction, roller thrust bearings, parallel expanding gates, super-finished stems and closed packing boxes.

For more data on above item, circle E458 on postcard, Page 243



Pressure Sealing Gate Valve provides a tight seal both up and down stream and requires no lubrication. The new

METROL®
Metering Separators
Do Double Duty

1 *SEPARATE WELL FLUIDS*

2 *METER THEM*

Battery of Model 24MS-0109C Type C Metering Separators

METROL® Metering Seperators save you money. Simple and rugged design assures continuous trouble free operation. They are easy to maintain at peak performance because of well designed, well made controls.

METROL Metering Seperators will seperate the oil and gas and will meter the oil. Patented* Snap Acting Liquid Level Control and positive valving sequence assures metering accuracy as high as 99.99%

Model 24MS—0109C Type C Metering Separator

Use of METROL Metering Seperators is accepted by most regulatory bodies. They are ideally suited for metering oil for royalty and tax payments, for testing wells, producing multiple completed wells into common storage tanks, test seperators at tank batteries and Automatic Lease Operation.

Sizes available are 16, 20, 24, 30, 36, 48, 60, and 72 inch diameter with 6' to 20' shell lengths in 125, 300, 600, 1200, 1500, 1800, 2000, 2400, and 3000 psi W.P. The units will handle from zero to 20,000 BPD. Dump volumes range from ¼ bbl. to 30 bbls.

*U. S. Patent No. 2,818,738

® Trade Mark Registered U. S. Patent Office

Every Unit is completely assembled, pressure tested, calibrated, and performance tested prior to shipment.

Competent Sales and Service Representatives located in all major oil areas.

OIL METERING and Processing EQUIPMENT CORP.

MELROSE 5-1226 • 4843 YALE STREET
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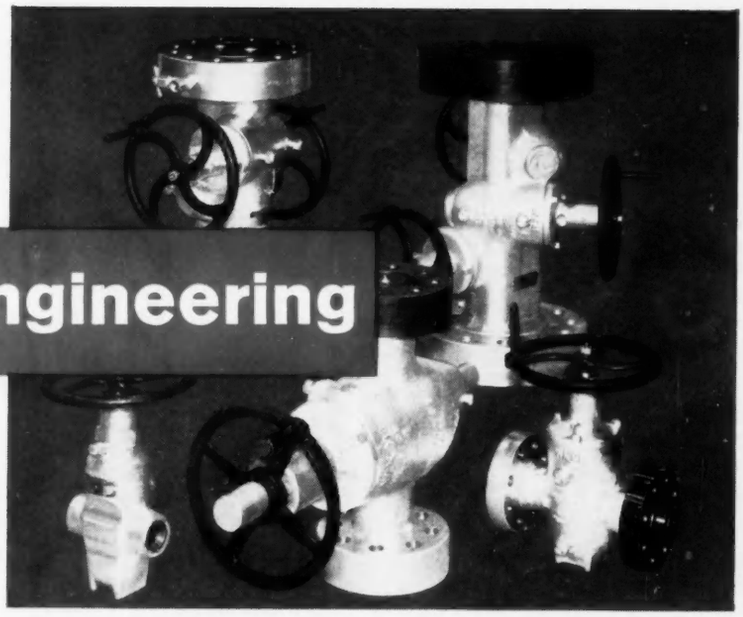
NOW

TOTAL Valve Engineering

W-K-M MAKES REPAIR EASIER



Top left to right: Integral Dual Completion Gate Valve; Integral Triple Completion Gate Valve. *Bottom left to right:* Recessed Body Gate Valve for Triple Completions; Balanced Stem Gate Valve; Standard Production Gate Valve.

Valves designed for fast on-line overhaul prevent major production losses

In many installations, W-K-M Gate Valves have *never* needed overhaul. But when repair *is* needed, W-K-M Valves are designed so *any* internal part—packing, stem, gate or seats—can be easily replaced while the valve is *on the line.*

And even under high pressure, W-K-M Valves permit many repairs which can not be made to other valves without lengthy shutdowns.

Far-sighted design that protects you against such eventualities is an important part of TOTAL Valve Engineering—W-K-M's unique dedication to *all* phases of valve technology. It's one reason why W-K-M Valves are world-renowned for helping prevent production losses!

W-K-M

DIVISION OF ACF INDUSTRIES
INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS

6005

PRECISE BOTTOM-HOLE ORIENTATION *in minutes*

WITH THE

NEW REGAN BOTTOM-HOLE ORIENTING SUB

- ★ *Cuts Rig Time*
- ★ *Maintains Continuous Mud Circulation*
- ★ *Eliminates use of Sand Line and Instrument*

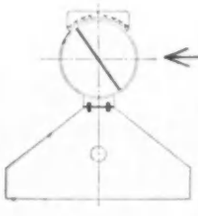
Ease of operation . . . fastest, most precise bottom-hole orientation in the drilling industry . . . all these benefits are yours when you use the Regan Bottom-Hole Orienting Sub. Field tested for nearly three years in holes up to 12,000 feet by major California drillers, this great new tool is now ready to bring its positive advantages to industry-wide drilling operations.

Featuring a pre-set splined jar one single above the deflection tool, the jar is tripped by a gravity-actuated ball. It indicates *at the surface* the correct tool orientation by shortening the drill string the length of the jar. *At no time does the ball support any weight to bind its movement or damage its race.*

For dependable hole insurance, plus fastest and most precise deflection tool orienting, check into the Regan Bottom-Hole Orienting Sub – soon.

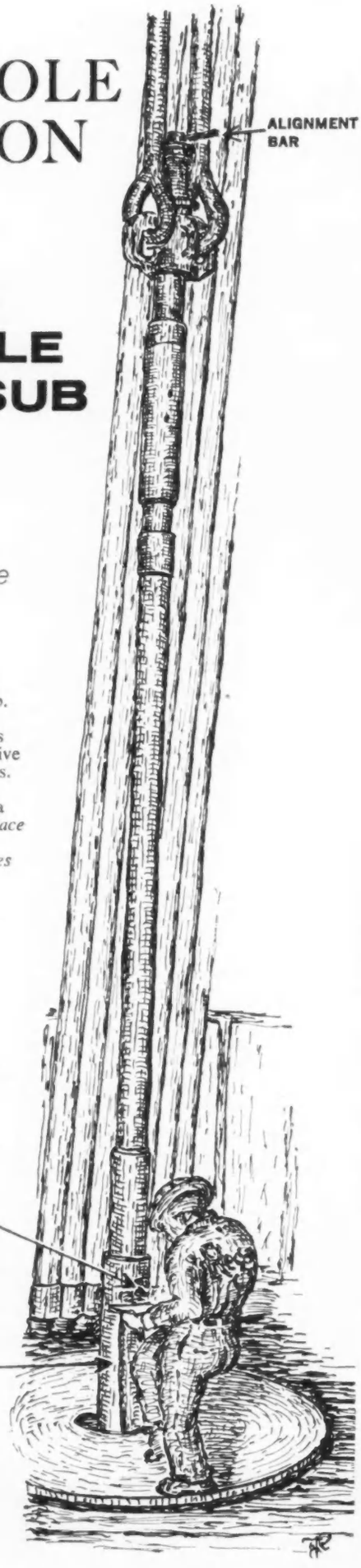
Advantages of deflection tool orientation from the *bottom* of the hole:

1. Absolute accuracy within closest tolerances.
2. Continuous mud circulation for a safe hole.
3. Elimination of time-consuming instrument runs; use and wear of sand lines.
4. Will repeat setting as many times as necessary without removing tool from hole.



PROTRACTOR

Protractor is placed on whipstock face with hair-line on mirror aligned with the alignment bar in orienting sub for fast, precise surface setting.



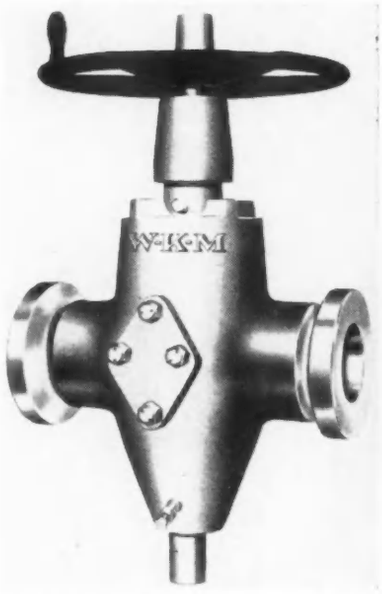
For full particulars, write to:

Regan® Quality — Forge & Engineering Co. — Wrought on the Forge of Experience

P. O. BOX 150 SAN PEDRO, CALIF.

line also features full bore and through conduit, seats that automatically adjust for wear, automatic upstream relief for excessive body pressure, and ease of maintenance. Available in the ASA 150 and 300 pound class and in a range of sizes from 2 through 30 inches.

For more data on above item, circle E459 on postcard, Page 243

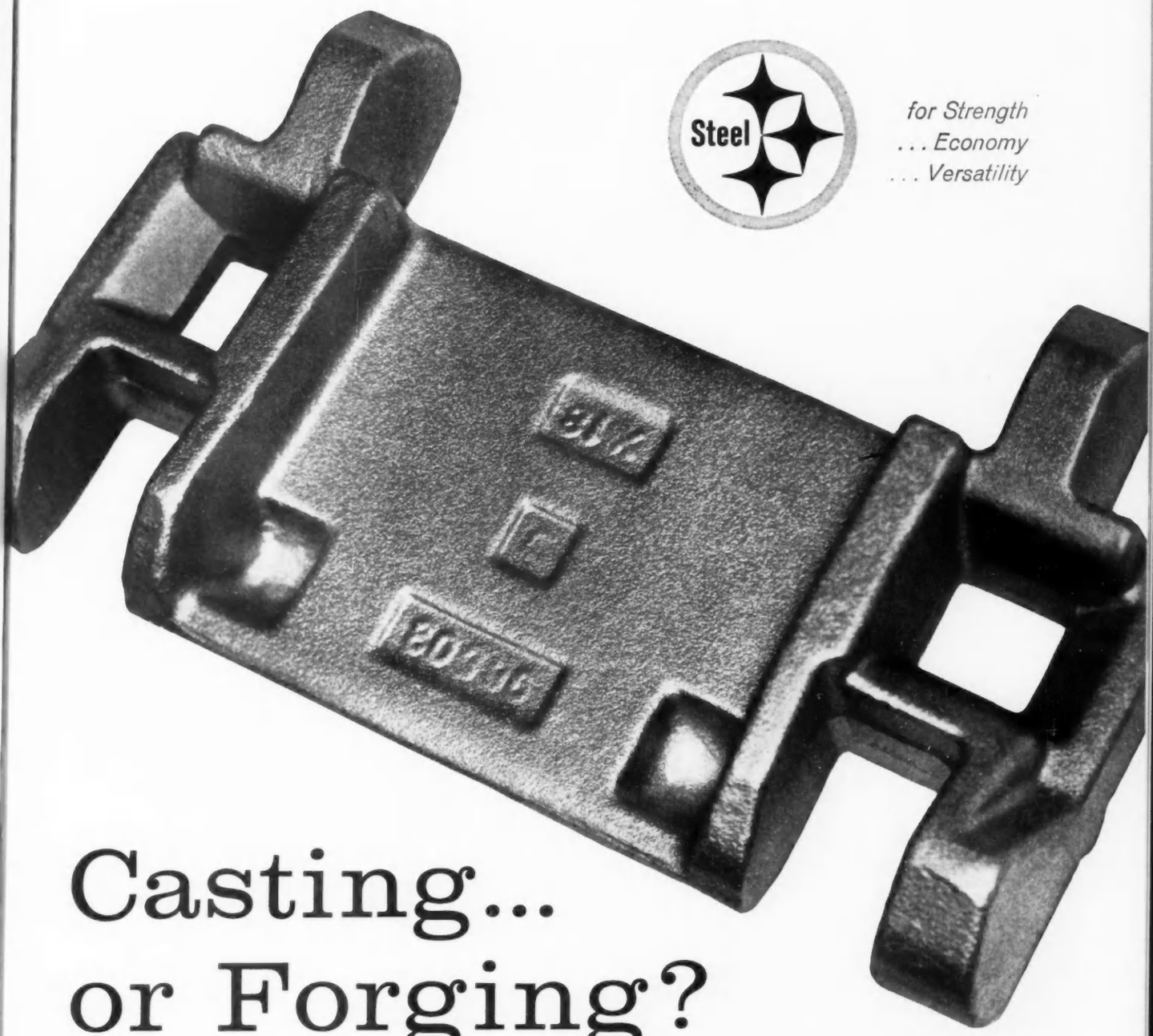


20,000 Pound Working Pressure Valve is a balanced stem valve with a test pressure of 40,000 psi. The balanced stem design overcomes heavy stem loads inherent in single-stem valves. "Balancing Stem" is attached to bottom of gate, and pressure in the valve body causes it to exert an equal force to, and in the opposite direction from, the force on the operating stem. This valve requires much less effort to operate, since force on the handwheel must overcome only gate drag during operation. The valve is equipped with ball thrust bearings, parallel expanding gates, superfinished stems and closed packing boxes.

For more data on above item, circle E460 on postcard, Page 243

Walker-Neer Manufacturing Company, Inc.

Model FWN-40 Failing Walker-Neer Rotary-Percussion Drill is designed to



Steel

for Strength
. . . Economy
. . . Versatility

Casting... or Forging?

From the look of it, most people would probably guess casting. But it's a forging. Which proves a point. Many parts *look* too complicated for forging, but actually aren't. By careful selection of parting line, close trimming, and punch-outs, we're often able to forge parts you'd never expect to obtain as forgings. If you have such a part (and would welcome the strength and economy of forgings), send us a finished print. We'll be glad to study it and tell you frankly whether or not we can forge it. If we can, you can count on us for fast delivery.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

drill equally well by the rotary or percussion drilling method. Neither drilling method is secondary, or less efficient. Rated rotary drilling capacity is 1,880 feet with 2⅞-inch drill pipe. The rated percussion drilling capacity is 2,000 feet of 8-inch diameter hole with 2,650 pounds of drilling tools. FWN-40 will drill up to 40-inch diameter holes to 600 feet deep with reverse circulation rotary drilling. The three drums of the FWN-40 are: bull reel, sand reel, and casing reel. Casing reel is used to handle either the drill pipe, kelly, or well casing with a 40,000-pound rated hook load. The drill is equipped with an 18-inch Failing rotary table that folds up next to the mast for percussion drilling.

For more data on above item, circle E461 on postcard, Page 243

Wallace & Tiernan, Inc.

Type FA-232 Fog Horn is an electric oscillator-type horn with improved energy conversion. It converts nearly 75 percent of battery input to acoustical output in a 360° horizontal plane. Exceeding U. S. Coast Guard Requirements, output varies from 104.8 db. with battery fully charged, to 101.5 db. with battery discharged, for a ½-mile rating. A closed feed-back loop retains a constant frequency of 400 cps even under varying atmospheric conditions. Power consumption is so small that battery requires replacement less than once a year. All parts exposed to marine atmospheres are made of corrosion-resistant fiberglass or stainless steel. Actuating units, power oscillator, drives, and program timer are located in a weatherproof compartment. Fog horn is suitable for vertical mounting on offshore rigs, and needs minimum maintenance. Dimensions: Height 3-feet, 7 inches; base 17⅝ inches; diameter 18⅝ inches. Weight: 110 pounds.

For more data on above item, circle E462 on postcard, Page 243

Navigation Lights for Bridges are designed for bridge or channel marking. A 115/13v. transformer, built into the light, enables special low-voltage, concentrated filament lamps to be used. Lamps give twice the candlepower per watt of conventional lamps. With standard 200 mm lens, beam from a 25 watt lamp is visible for 4½ miles. Lamps have burning life of 2,500 hours each. They are shock-mounted in an automatic four-place lampchanger to resist vibration damage. Light thus burns for 10,000 hours before servicing. Intervals between servicing may be further increased by use of a sun switch to control on/off time. Light is constructed of bronze, with black steel and galvanized pipe mountings. Models are available for pedestal mounting, or for swivel mounting for channel markers. Red or green lenses are supplied. Weight: 50 pounds.

For more data on above item, circle E463 on postcard, Page 243

250 mm Marine Lantern With Flasher Mechanism is designed for use as an omni-directional light or as a bi-directional range light. Featuring a 250 mm acrylic lens, the lantern has double the candlepower output of a light with conventional pressed glass lens. Four or eight-place lampchanger automatically replaces burnt-out lamp with another. Unattended service up to 2 years is possible—longer if optional sun switch is used. Lantern has built-in focusing, leveling, and sighting to simplify installation. It is constructed of aluminum, stainless steel, and other corrosion-resistant materials for added durability. Use of plastic materials reduces weight to 19½ pounds. Lantern may be readily mounted on offshore rigs, bridges, etc. Red, green, or clear acrylic lens covers are supplied. Two condensing panels adapt lens for use as a bi-directional range light. Dimensions: Height 20¼ inches; diameter 17¾ inches.

For more data on above item, circle E464 on postcard, Page 243

Warren Automatic Tool Co.

WATCO Differential Flowmeter is the first instrument capable of recording changes in downhole mud circulation as they occur. It is unaffected by changes of level in mud tanks or by any operation on the surface, responds instantly to changes in flow rates as small as 5 gallons per minute, and offers no obstruction to flow in or out of the hole. Flowmeter consists of one electromagnetic transducer installed in the mud flow-line and another installed in mud line between pumps and stand pipe. Signals

Your Drill Collars Get Longer Life and

Greater Protection

KOPR-KOTE®

ANTI-SEIZE COMPOUND

WORLD WIDE

MFD. UNDER U. S. PATENT NO. 2,543,741

DRILL COLLARS
Positively prevents seizure and washouts. Insures longer joint life, fewer recuts. Protects threaded connections under any conditions... severe torque, extreme loads, high pressure. Will not compact in threads.

NEW TOOL JOINTS
The perfect break-in compound for new connections.

CASING & TUBING
Unexcelled as a permanent leak-proof thread seal. Assures full makeup without galling.

For Drill Collars, Tool Joints, Casing and Tubing

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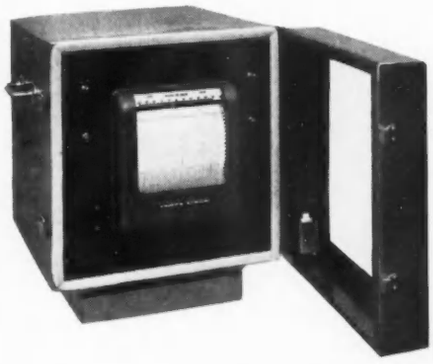
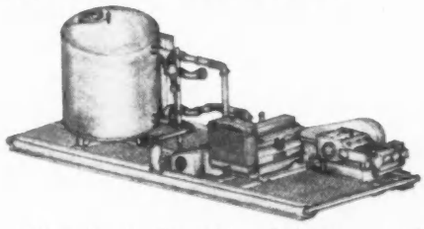
LICENSED MANUFACTURERS
CANADA: Jet-Lube of Canada, Ltd., Edmonton
ENGLAND: Jet-Lube Ltd., London
AUSTRALIA: Jet-Lube (Australia) Ltd., Sydney



from transducers are received on derrick floor at a signal-light box and specially developed recorder installed at driller's position. Flow rates (inflow and outflow) are measured, compared, and their difference recorded in G.P.M. on strip-type chart. A selector switch permits driller to selectively check inflow or outflow separately at any time. Flowmeter provides immediate detection of actual gains and actual losses of mud to or from the formation only. This new service offers protection against stuck drill pipe, excessive mud costs, and blowouts.

For more data on above item, circle E465 on postcard, Page 243

Waukesha Sales & Service

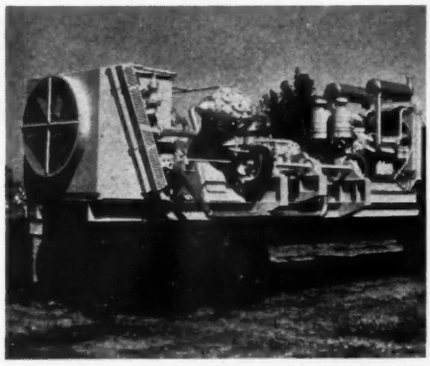


Waterflood Portable Injection and Filter System is completely automatic and designed to adjust to all injection programs—from the simplest to the most complex. A single Waukesha power unit is used as a prime mover for injection pump, and filter and backwash pumps. Drive and clutch arrangement provide for operation of any combination of pumps according to requirements. Engine, injection, feed and backwash pumps, filter, and piping and control systems are all packaged on one easily moved skid-mount unit. There is continuous injection as feed pump maintains filtered water at proper levels. Filter is automatically backwashed when necessary. Unusual fresh water loss will disengage injection pump while feed pump restores level. Backwash is repeated if necessary. Low source water level disengages feed pump until level is satisfactory for pump suction requirements. Pumps return to normal operation when fluid levels are restored.

For more data on above item, circle E466 on postcard, Page 243

Well Completions, Inc.

V-12 Tornado Compressors and Boosters for Air and Gas Drilling are fabricated with GMC V12-71 diesels rated at 290 horsepower at 1,600 rpm. For maximum portability and rigging up speed, all Tornado packages are trailer mounted complete with 550 gallon fuel tank. V-12 compressor features belt driven power transmission. An Ingersoll-Rand Supercharger first stage gives a 6 psig inlet pressure to second stage. Second and third stages are in Joy WH-102 13½, 7 x 7 double acting compressor. At 4,800



feet elevation, the V-12, 3-stage Tornado gaged 1,120 cfm at 250 psig discharge pressure, 120° F effluent air temperature. Intercooling and aftercooling by Carr X-Changers is also to be found on W-12 booster. Mounted on single axle trailer, the double acting two-cylinder booster can take 3.36 MMCFAPD from an inlet pressure of 180 psig to a discharge pressure of 950 psig, effluent air temperature 120° F.

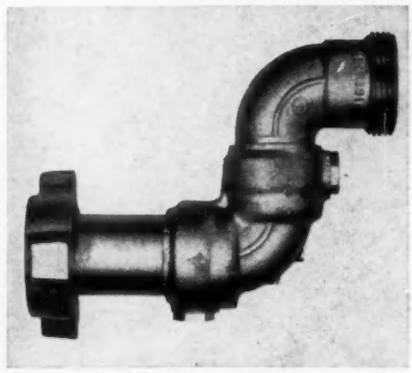
For more data on above item, circle E467 on postcard, Page 243

Well-Foam "FS" is a linked anionic/nonionic surfactant designed for foam drilling with air or natural gas through a wide range of formation water salinities. The "FS" formula, in which anionic group is chemically linked to nonionic chain, is practically as efficient in 10 percent brine as it is in fresh water. Foam stability is only slightly affected by 200° F temperatures. In concentrated salt water (15 percent-18 percent), only a very slight increase of Well-Foam is required to maintain full efficiency in foam drilling. It is non-toxic with viscosity of 150 cps at 72° F. Pour point is minus 15° F. The yellowish-brown colored foaming agent is soluble in water, brine, and alcohol, but insoluble in kerosene.

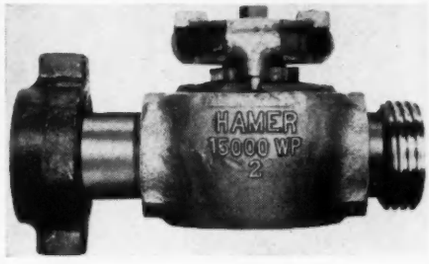
For more data on above item, circle E468 on postcard, Page 243

Well Equipment Manufacturing Corp.

Chiksan Swivel Joints, Styles 50 and 10, Sizes 2-Inch 2½-Inch EUE and 3-Inch; the 2-Inch 15,000 Pound Long-sweep Joint and the 2-Inch Model DR-150W Hamer High Pressure Plug Valve are now available with WECO Union male and female subs as end connections. WECO Union end connection's exclusive design permits the wing nut of the union to be installed over the male sub after it has been machined integral with the Swivel Joint or Valve. This makes



Swivel Joint



Hamer Plug Valve

it possible to produce Swivel Joint and Valves with Union end connections as an integral part, thereby eliminating all fabrication in their production. Union end connection allows the Swivel Joint or Valve to be connected directly to a WECO Union of the same size and pressure rating, thus eliminating short nipples and pipe threads, usually one of the trouble spots in piping on extra high pressure services, such as cementing, acidizing and fracturing. With female sub of Union on one end and the male sub on the other end, the operator is able to run all of the unions in same direction in the piping hook-up.

For more data on above item, circle E469 on postcard, Page 243

Well Logging Equipment Manufacturing Co.

WEMCO HFI Hydrocarbon Analyzer is an ultra-sensitive chromatograph designed to provide the high order of sensitivity and stability needed in laboratories and mud logging industries. The unit's superior stability results from its operation on the principle of hydrogen flame ionization, rather than electrical bridge imbalance. Sensitivity ranges from 1 to

LOOKING UP—Length of drill starts into the hole after change of bits. Falcon Seaboard Drilling Co. of Tulsa is drilling this well with a 9,500-foot string of Pittsburgh Seamless 4½-inch Grade E drill pipe. Falcon Seaboard has used Pittsburgh Steel tubular goods and an independent distributor for many years with pleasing results.

Pittsburgh Steel's Independent Distributors...

PUT THIS IN YOUR PIPE---SERVICE!

Drillers who use Pittsburgh seamless on well after well have a lot more than dependable drill pipe, casing and tubing going for them.

They have what Falcon Seaboard Drilling Co. of Tulsa calls "fair treatment from the mill" and—independent distributors who go more than the proverbial extra mile to provide service.

Boone Smiley, manager of the Mid-Continent Area for Falcon Seaboard, said:

"We've used Pittsburgh Steel's independent distributors through the years in times of short supply and when pipe was readily available. We've always felt that Pittsburgh Seamless did a job for us and the mill has always been fair."

Photographs on these pages show effective results of the close relationship between drillers and operators on one side and a Pittsburgh Steel independent distributor on the other. Here, near Maysville, Okla., Falcon Seaboard is using 9,500 feet of Pittsburgh Seamless 4½ inch O.D. Grade E Drill Pipe on the fourth well the string has drilled in the area in recent months.

The independent who supplied this drill string to Falcon Seaboard sold the first string of oil country tubular goods manufactured by Pittsburgh Steel. Continued progress through the years has been based on *service* to the trade.

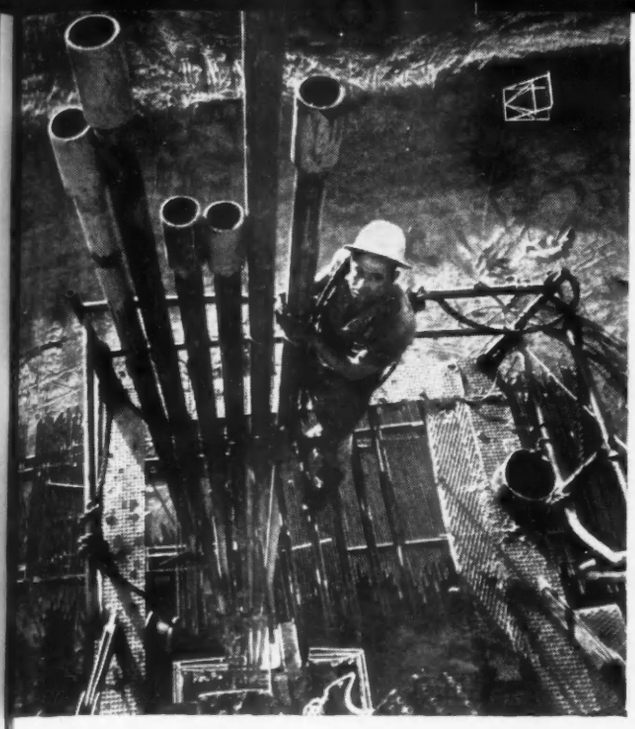
"We can't afford to get lazy," declared William G. Rudd, the distributor's sales manager. "The oil business is always subject to critical emergencies and they all have big dollar signs. It's up to us to pitch in and help."

As a case in point, during periods of acute shortage, this distributor set up a service called the Mid-Continent Pipe Exchange. As a free service to the industry, oilmen were polled for tubular material which they wished to swap for goods more strategically located, or more suited to their needs.

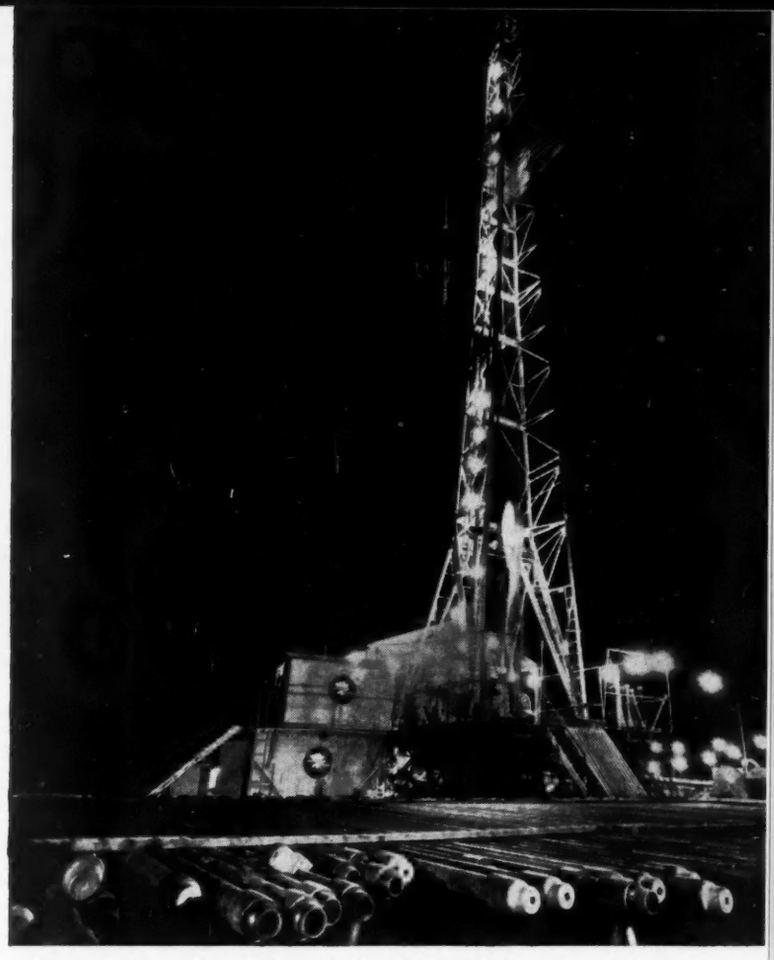
This extra service by Pittsburgh distributors is matched by the extra stamina you always get in Pittsburgh Seamless Drill Pipe—a stamina which stems from long experience in making special steels for the special jobs in the oil country.

When you buy your next string of drill pipe, or when you're ready to run casing or tubing, remember the combination of Pittsburgh Steel Co. and independent distributors offers you the kind of service—plus the utmost in dependable seamless tubular goods—that isn't available any other place.

It's easy to get lined up with an independent. They're listed at right. Call the nearest one today for quality seamless tubular products.

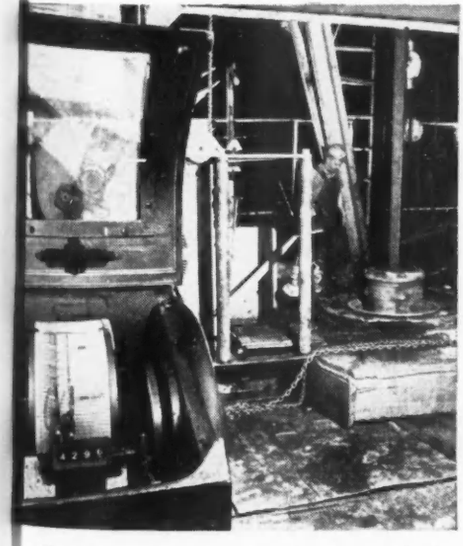


LOOKING DOWN—On monkey board of 131-foot, A-mast rig, roughneck gets joint of Pittsburgh Steel Co. drill pipe ready for re-entry during a trip. The 9,500 feet of drill pipe shown at top and on racks below was used to drill three previous wells.



Falcon Seaboard Drilling Co.'s No. 35 rig is at work here on a Sunray Mid-Continent lease near Maysville, Okla.

Driller Oliver Clark, left, chats with Max Thomas, distributor's representative, and Jewel Smith, Pittsburgh Steel field engineer.



Geolograph on same rig shows hole is at 4,296 feet with the rotary table, seen at right, operating smoothly. Geolograph chart indicates driller is midway between joint connections.

Distributor Home Offices

Bennett Supply Company
Midland, Texas

Atlas Bradford Company
Houston, Texas

Buckeye Supply Company
Zanesville, Ohio

C. W. Cotton Supply Company
Tulsa 5, Oklahoma

Franklin Supply Company
Denver 10, Colorado

Houston Oil Field Material Co.
Houston, Texas

Industrial Supply Company
Wichita Falls, Texas

Iverson Supply Company
Tulsa, Oklahoma

Longhorn Supply Co., Inc.
Houston 14, Texas

Lucey Export Corporation
New York 7, New York

Lucey Products Corporation
Tulsa 19, Oklahoma

McJunkin Corporation
Charleston 22, West Virginia

Midland Supply Company
Wichita 7, Kansas

Mountain Iron & Supply Co.
Wichita 2, Kansas

The Producers Supply & Tool Co.
Fort Worth 2, Texas

Production & Refining Equipment Company
Odessa, Texas

Sandy Supply Company
Wooster, Ohio

Southwest Supply Company
Pittsburgh, Pennsylvania

The Straker Supply Company
Jackson, Michigan

Superior Iron Works & Supply Co.
Shreveport, Louisiana

Tex-Tube, Inc.
Houston 7, Texas

Western Supply Company
Tulsa 1, Oklahoma

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

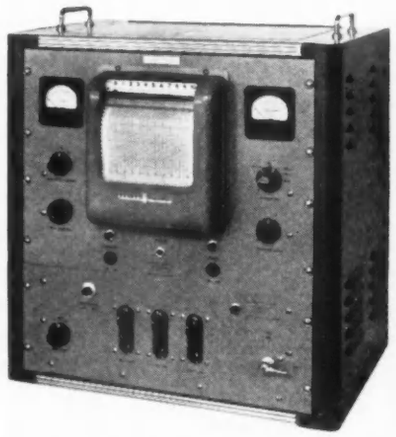
DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

Steel

5 parts per million of hydrocarbon gas in air. Response to any one component is linear throughout its span of 50,000 to 1. Ruggedness and reliability are increased because a preamplifier is not used in measuring circuit. Attenuator ranges from 1 to 1000 permit on-scale readings of large percentages of components as well as trace quantities. Detector cell is a linear device that is sensitive only to organic compounds. Thus permanent gases and inorganic materials are not measured. Standard chromotographic column eliminates need for sample splitters or other nonlinear devices. A standard hypodermic injection port and precision sample valve insure adequate sample volumes. Air used as the carrier can be supplied by any source that provides more than 30 psi. Necessary hydrogren supply can be obtained from an auxiliary electrolytic hydrogen generator or a cylinder of compressed hydrogen. Completely contained in cabinet 16 inches high, 22 inches wide, 15 inches deep.

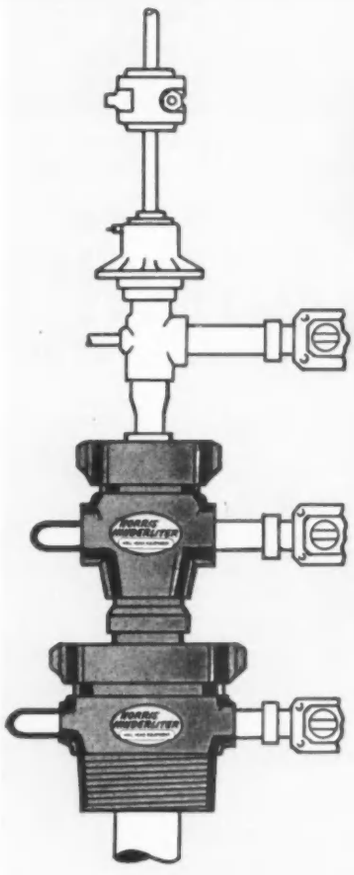
E470 on postcard, Page 243
For more data on above item, circle



WEMCO HFI Gas Monitor is an ultrastable gas monitor designed for use on the drilling rig. It continuously monitors trace quantities of hydrocarbon gases in an air stream, is both highly stable and extremely sensitive. Unit's long-term stability results from use of hydrogen flame ionization, rather than electrical bridge imbalance. This feature avoids drift caused by filaments or thermal conductivity cells. Sensitivity is approximately 300-500 times greater than conventional mud logging hot wire bridge detector. Higher sensitivities are available with special preamplifier. Attenuation ranges are from 1 to 1000. Percentage of gas concentrations can be read directly on recording chart, with appropriate attenuator settings. Detector cell is linear device sensitive only to organic compounds. Thus permanent gases and inorganic materials are not measured. Pneumatic system permits samples to be gathered from a distance of a few hundred feet. Free air may be selected to check instrument zero. Gas samples containing more than 5 percent gas can be diluted with an accurately metered quantity of air. Necessary hydrogen supply can be obtained from auxiliary electrolytic hydrogen generator or cylinder of compressed hydrogen. Contained in cabinet 23 inches high, 22 inches wide, 15 inches deep.

E471 on postcard, Page 243
For more data on above item, circle

Engineered Simplicity



NORRIS
HINDERLITER
WELL HEAD
EQUIPMENT

Write for Well Head Equipment Bulletin for complete information.

W. C. NORRIS, MANUFACTURER
DIVISION OF DOVER CORPORATION
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BRANCHES: Great Bend, Kansas; Corpus Christi, Houston, Kilgore, Odessa, Wichita Falls, Texas; Oklahoma City, Oklahoma; Salem, Illinois; Casper, Wyoming; Farmington, New Mexico; Edmonton, Alberta, Canada.
NORRIS HINDERLITER WELL HEAD EQUIPMENT
Buy From Your NORRIS Distributor

The White Motor Company—Autocar Division

Model DC20366T

Model C5766-OH

Models C5566 and C5766-OH have been added to Autocar's line of heavy duty, all wheel drive trucks and tractors.

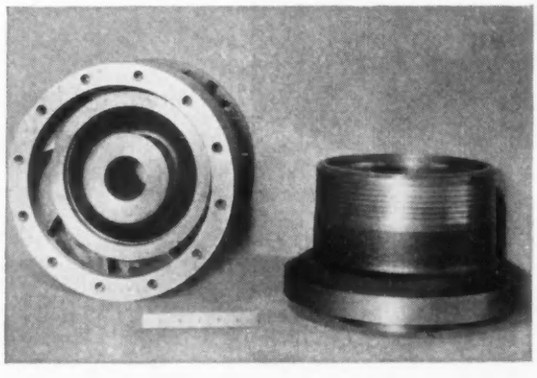
Irons Give Pumps and Valves of Valuable Properties

Ni-Resist* ductile irons are a family of versatile high-alloy cast irons, containing 18% to 36% Nickel.

They combine the strength and toughness of ductile iron with the corrosion resistance of Ni-Resist.

Each type combines engineering properties which improve the performance and extend the service life of pumps, valves, and other oilfield equipment:

- **Strength**—Ni-Resist ductile irons provide tensile strengths of 55,000 to 65,000 psi, yield strengths of 30,000 to 40,000 psi.
- **Ductility**—Ni-Resist ductile irons show a high order of elongations (up to 40%), imparting a high degree of toughness for resistance to impact.



CAST TO LAST—Pump at left is being installed in an Oklahoma well to move large quantities of salt water in a secondary recovery operation. Both the diffuser and pump head (above) are castings made of corrosion-resisting Ni-Resist Ductile Iron.

- **Corrosion Resistance**—Ni-Resist ductile irons safely handle such corrosives as sour crudes, mineral acids in crude, salt water, and oil-filled brines.
- **Wear Resistance**—Ni-Resist ductile irons can be mated to many engineering materials, where they have excellent resistance to wear and galling over a wide range of temperatures—especially under corrosive conditions.
- **Erosion Resistance**—Ni-Resist ductile irons give outstanding performances in high-velocity liquids. Their high strength and resistance to cavitation-erosion mean long service for pump parts.
- **Machinability**—Ni-Resist ductile irons machine as well as common pressure-type gray irons.

Other features, too. We've given only some of the highlights. You can get more facts about this versatile new family of hard-working, long-lasting metals in our...

Free Booklet, "Engineering Properties of Ni-Resist Ductile Irons." Here—complete with photos, tables and graphs—you'll have all the information you need to decide how and where Ni-Resist ductile irons can help you. To have all the facts on hand, just write for your copy.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street INCO New York 5, N. Y.

NI-RESIST
DUCTILE IRON

NICKEL-ALLOYED IRONS PERFORM BETTER LONGER

The C5566 is rated at 46,000 pounds GVW and has a chassis weight of 13,785 pounds (includes fuel, oil, water). The C5766-OH, an off-the-highway unit, has a 55,000 pound GVW and a 14,950 pound chassis weight. Both models are powered by a 185 horsepower, Super Mustang, gasoline engine. Flywheel or transmission mounted power take off may be installed on either chassis. The C5566 and C5766-OH are designed for oil field service operations where maximum traction in all types of weather and terrain is required.

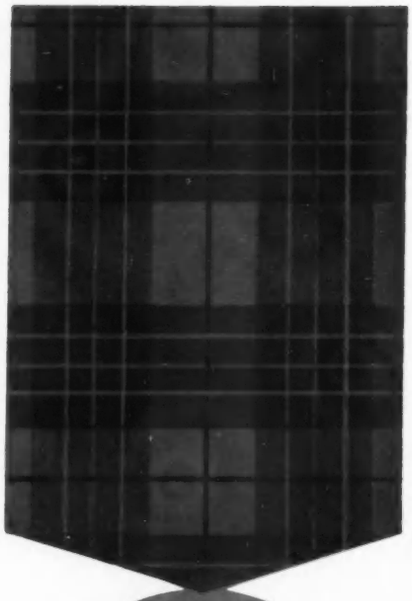
For more data on above item, circle E472 on postcard, Page 243

The Western Company

"Jet Fracmaster 1200," recently placed in field use in West Texas, introduces the first harnessing of gas turbine power for fracturing use. The "jet" power of unit is supplied by a Solar Aircraft Company Saturn T-1000 gas turbine engine. Western Gear Corporation designed and manufactured a special four-speed transmission to harness this jet power. Third component is RB-100 roller bearing pump manufactured by The Western Company. RB-100 is patterned after Western's RB-80, a smaller capacity pump successfully used in the field for the past six years. Unit weighs some 15,000 pounds less than diesel units delivering less than 600 horsepower. It attains more than 1,000 hydraulic horsepower in all pressure and volume ranges. Gas turbine engine is rated at 1,250 brake horsepower, yet weighs only 1,200 pounds. RB-100 pump can discharge up to 38 barrels of fluid per minute. Light and powerful, Jet Fracmaster is highly mobile, versatile unit with highest efficiency.

For more data on above item, circle E473 on postcard, Page 243

WINNING COMBINATION by McKISSICK



WIDEST POSSIBLE RANGE OF SIZES AND CAPACITIES — UNBEATABLE MCKISSICK CONSTRUCTION — EXTRA HEADROOM, SHORT OVER-ALL LENGTH. CENTER PLATES BETWEEN EACH SHEAVE.

EXTRA WEIGHT FOR BALANCE . . . JOHNS-MANVILLE "KLIPPER" GREASE SEALS.

EXTRA LARGE BEARING DIAMETER, E-Z OPENING GUARDS. NO BOLTS TO REMOVE. 17" TO 42". O. D. ALLOY STEEL FLAME HARDENED SHEAVES. BUILT IN "BUMPER".

BE SPECIFIC . . .
GET McKISSICK!

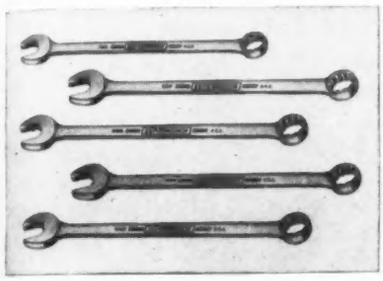
McKISSICK

McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

Wichita Clutch Company, Inc.

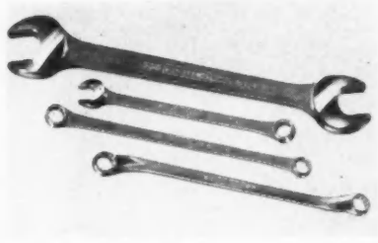
Wichita Catheads feature Wichita Clutches for smooth operation and fast, positive control. Used on well servicing units and small rigs.

For more data on above item, circle E474 on postcard, Page 243



line are slimmer, more comfortable handles, smoother contours and strong, thin heads that allow maximum clearance in close quarters. New design has imparted a "balanced feel" throughout all sizes in the four styles of wrenches offered.

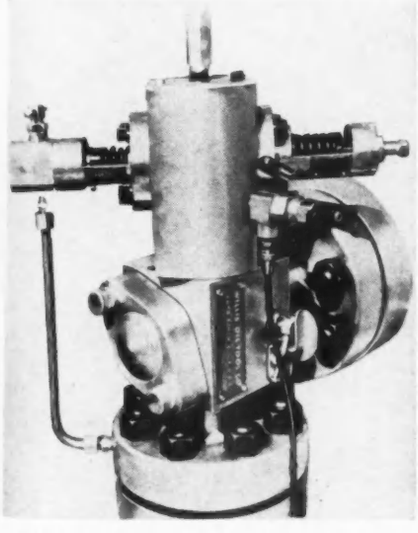
For more data on above item, circle E477 on postcard, Page 243



Open-End Box Type Wrench is now available in 1-11/16, 1¾, 1-13/16, 1⅞ and 2-inch 12-point opening sizes. These wrenches have exceptional strength for their thin, slim jaws and sleek handles. They are drop-forged from selected alloy steel, heat-treated and chrome-plated over nickel.

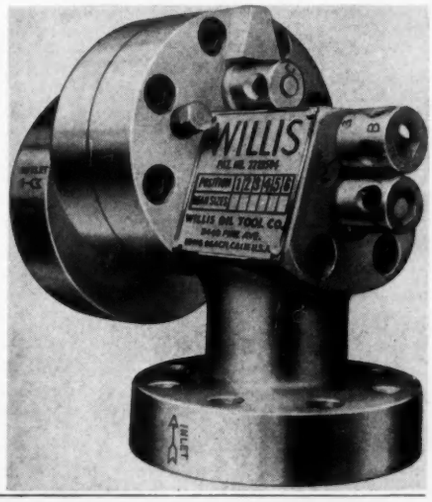
For more data on above item, circle E478 on postcard, Page 243

Willis Oil Tool Company

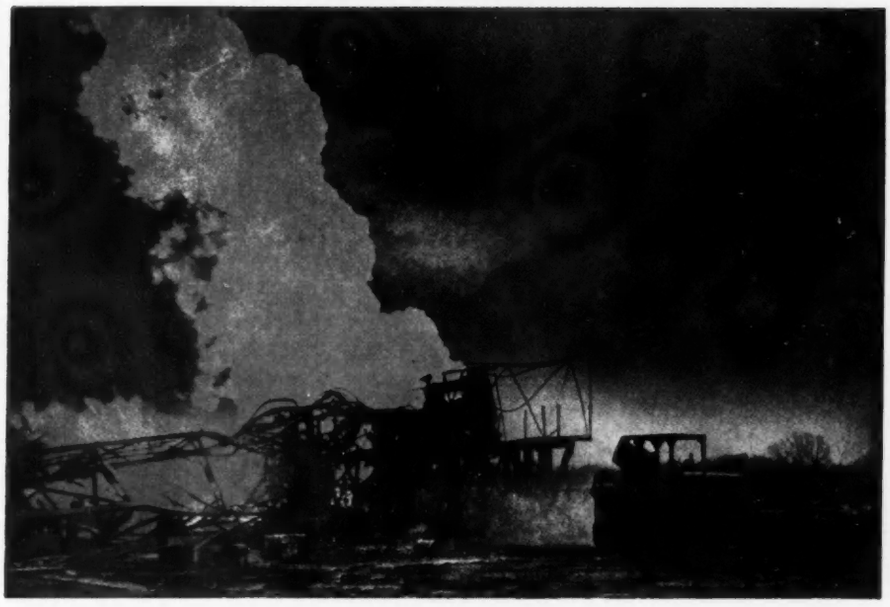


Willis Oil Tool Hi-Lo Safety Shut-Off Valve tests both high and low valve pressure settings without having to shut in the well. Design enables valve to reset itself with live pressure and to work with pressure rather than against it. Eliminates need for screw-jack resetting and for auxiliary pressure accumulator. The valve's versatility enables it to be easily adapted for automational remote control and for high fluid level shut-off. Pressures from 35 to 10,000 psi are safely handled due to valve's rugged construction. Shut-off is accomplished by a pressure-energized piston with teflon seats. This piston is actuated from an opening in a stainless steel piston valve with teflon insert seats and adjustable pressure control spring.

For more data on above item, circle E479 on postcard, Page 243



Willis "L" Type Rotary Adjustable Flow Bean, connected to the steel cross in a christmas tree hook-up, provides accurate, adjustable flow control through flow line. Positive indexing allowing for increased or decreased flow is instantly accomplished by rotating the orifice (choke) carrying disc 60° to the next



A "Pit-O-Graf" MIGHT HAVE SAVED THIS WELL

A Pit-O-Graf can give adequate warning to prevent a blowout. But, it must be where the driller can see it, can take advantage of it. Here's what users have to say:

One oil company says — "Although blowout prevention is a matter of concern for the operator, the contractor, and the drilling crews, generally *the driller is the key man.*"

Another company says—"Since a pit level indicator is so important, take these precautions to get the most good out of it: Place the pit level recording instrument at or near *the driller's position on the derrick floor.*"

If the driller's responsibility is not misplaced, then he can recognize the danger signals that precede every blowout. With the Pit-O-Graf record before him, he can intelligently analyze the *rate* of gain or loss of mud as recorded and thereby direct his crew in the orderly control of the situation at hand. In this case the threatened blowout would become *one that does not happen.*

WARREN AUTOMATIC TOOL CO. WATCO HOUSTON

WARREN AUTOMATIC TOOL CO.

3915 THARP STREET • HOUSTON, TEXAS

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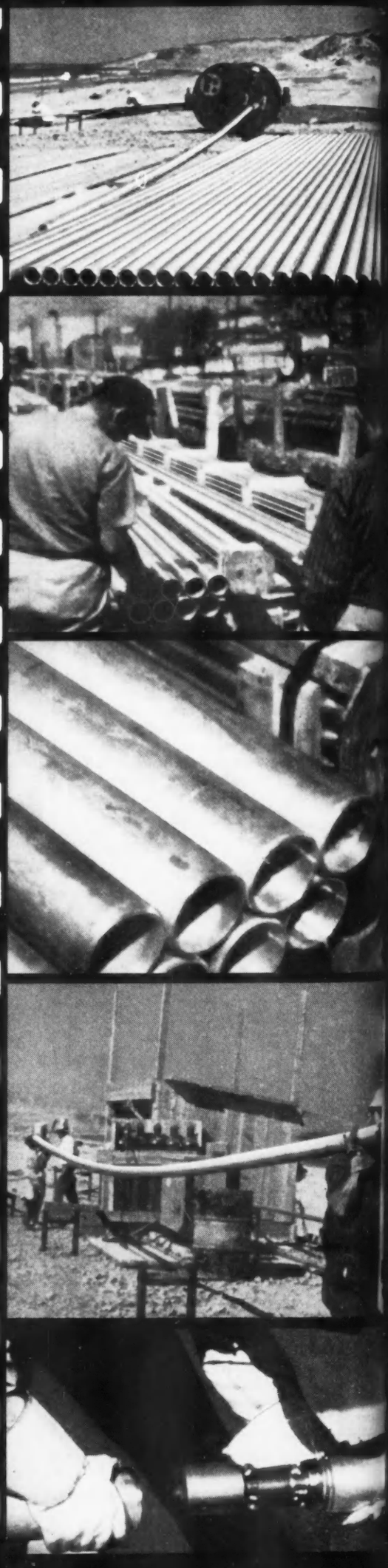
ALCOA makes Pipeline History on First Underwater Completion Well!

...with one and a quarter miles of light, strong Alcoa Aluminum Pipe flexible enough for launching in heavy surf and sweeping crosscurrents

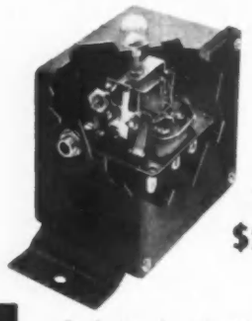
The flexibility, light weight and outstanding corrosion resistance of ALCOA® Aluminum Pipe made important contributions to the success of the world's first underwater ocean oil well completion by Peruvian Pacific Petroleum Co. □ Located on the ocean bottom, 132 feet down, the wellhead is 6,200 feet from shore. Its flow system is Schedule 40 aluminum pipe—a 3-in. flow line and a ½-in. hydraulic valve control line. □ Peruvian Pacific, a subsidiary of Cities Service Co., as operator in the joint venture with Richfield Oil Co., had good reason to select aluminum. With the wellhead on the bottom, submarine pipelining was called for. That demands pipe with superior corrosion resistance. ALCOA Aluminum Pipe has it—with no need for costly coatings or wrappings. □ Just as important, since the pipe was to be launched in one continuous length through heaving surf and strong sea currents, it had to be flexible enough to roll with the punch. Aluminum's favorable modulus of elasticity gives just that kind of flexibility. □ Illustrated at right are frames from a new motion picture showing this historic piping operation . . . job-site storage of the specially fabricated 50-ft pipe sections . . . welding into continuous lengths . . . bundling of the two pipe sizes . . . stringing down the beach . . . launching through pounding surf and racing currents in which the pipelines were deflected by hundreds of feet without rupture. □ The complete film of this exciting operation is available from ALCOA. Contact an ALCOA representative. He'll gladly arrange for you to see the film. □ A paper detailing the Peruvian Pacific operation will shortly be published. To reserve a copy, write ALUMINUM COMPANY OF AMERICA, 879-M Alcoa Building, Pittsburgh 19, Pa. □ World-wide sales through ALCOA INTERNATIONAL, INC., 230 Park Avenue, New York 17, N. Y.



ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

VIBRATION and SHOCK SWITCH!



VS-1
$29.50

Explosion Proof add $23.50.

MURPHY

Sensitive to abnormal oscillation in two planes of motion, recommended for use on engines, pumps, pumping units, compressors or any other equipment subject to destructive motion.

Same model can be wired to ground ignition, sound alarm, activate control panel lights, or operate valves such as Diesel fuel shut-off valves, and electric motor controller circuits. Rated at 5 Amps, 110 V AC.

•

Also safety switch-gauges to protect engines and equipment against any type of malfunction.

Time, temperature, pressure, level controls, automatic engine or motor controllers and complete control panels.

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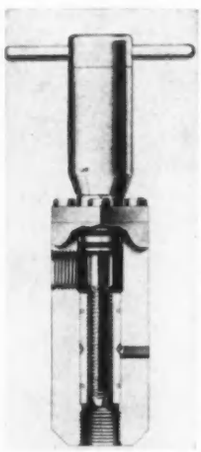
larger or smaller orifice position. By installing a blank insert in any one of the six orifice positions, positive shut-in can be realized by revolving orifice-carrying disc to place blank orifice in line of flow while well is flowing. This eliminates need of a wing valve in the hook-up and provides simpler, more compact christmas tree assembly. "L" Type Flow Beans are available with either screw or flange type connection for 1, 2 and 3-inch flow hook-ups. Orifice inserts graduate in increments of 1/64-inch and range in sizes from 1/64-inch to 74/64-inch. Also special sizes equivalent to 10 percent of the flow, W/.002-inch increments.

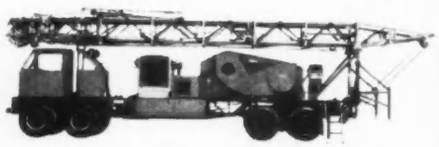
For more data on above item, circle E480 on postcard, Page 243

Willis Fluid Control Valve was developed for control of fluid to hydraulically-actuated pumps, including deep well free pumps. Replaceable stem assembly can be installed for highly accurate gas control. Valve incorporates a positive helical orifice that remains the same in cross-sectional area at all flow volume settings. Regardless of setting, there is ample clearance for passage of foreign particles that would normally shut off or clog annulus of a needle or other type fluid control valve. Small capacity stem has helical orifice area of .0045 sq. in. to pass from 10 b/d of fluid with 1,350 psi differential. Medium capacity stem has helical orifice area of .0135 sq. in. to pass from 40 b/d to 240 b/d of fluid with 1,350 psi differential. Large capacity stem has helical orifice area of .0194 sq. in. to pass from 60 b/d to 1,800 b/d of fluid with 1,350 psi differential. Special capacities available on request. Pressure ratings, 5,000 psi W.P. 15,000 psi test.

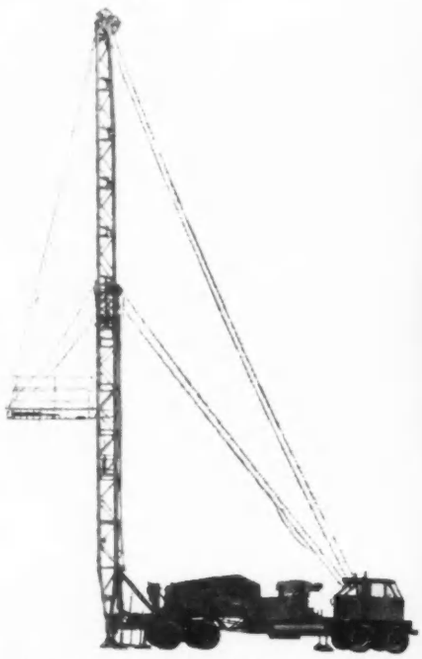


For more data on above item, circle E481 on postcard, Page 243

Wilson Manufacturing Co., Inc.



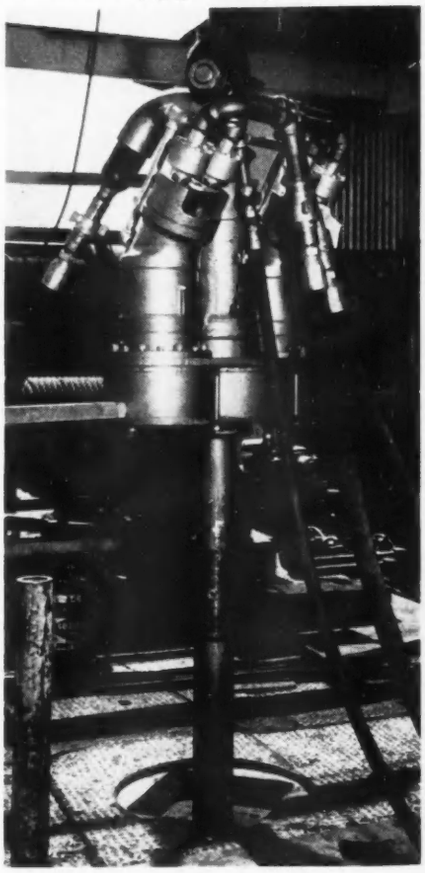
Winchmobile Junior, a lightweight self-propelled unit for deep well servicing, is newest in Wilson's line of servicing equipment. Available with either Super Model Winch rated for 6,000 feet of 2½-inch tubing, or Super "38" Winch rated for 8,000 feet of 2½-inch tubing. Double or Single Drum Winches are optional. The truss type construction of carrier frame and cross mounting engines of Wilson Winchmobiles are maintained in lighter weight Winchmobile. Pictured—Winchmobile Junior has double drum Super "38" air controlled



Winch, a fabricated "Manten" 66 foot wire line raised mast, 38,000 pound capacity dual rear axles, and 18,000-pound capacity dual front axles, both with power steering.

For more data on above item, circle E482 on postcard, Page 243

Wilson Supply Company



PS-70 Hydraulic Power Swivel is a rotary power unit, designed to be attached to and rotate drill pipe and tubing for light to medium drilling opera-

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The Mass Flowmeter is the first significant challenge to volumetric metering of flowing gas. The Mass Flowmeter meters fluid mass. The volumetric variables—pressure, temperature, supercompressibility and the rest—which affect volumetric metering do not affect the Mass Flowmeter. No extra recording or measuring instrumentation is required. Meter readout is direct, immediate and accurate . . . in pounds. Only a specific gravity reading is required to convert the pound reading to volume.

If you want to know more about the BS&B True Mass Flowmeter contact your BS&B sales representative or write: BLACK, SIVALLS & BRYSON, INC., MASS FLOWMETER SALES, P.O. Box 1714 Dept. 3-B12 Oklahoma City, Oklahoma.

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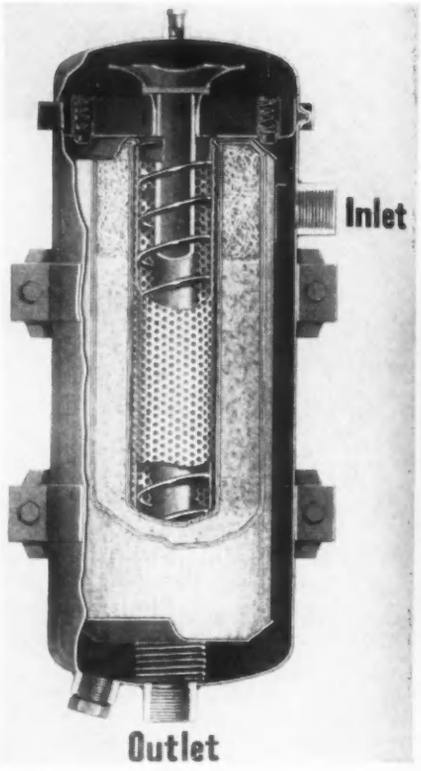
BS&B mass flowmeter

tions. Speed and torque are controlled from a remote portable console, with speeds up to 100 rpm in either direction and torque up to 4,000 ft. lb. With a minimum of moving parts, unit operates under load at maximum speed for an indefinite period without overheating or other adverse effect. Fire hazard is minimized as the power unit may be spotted at a safe distance from the wellhead. All moving parts are completely sealed and protected by full-time lubrication.

For more data on above item, circle E483 on postcard, Page 243

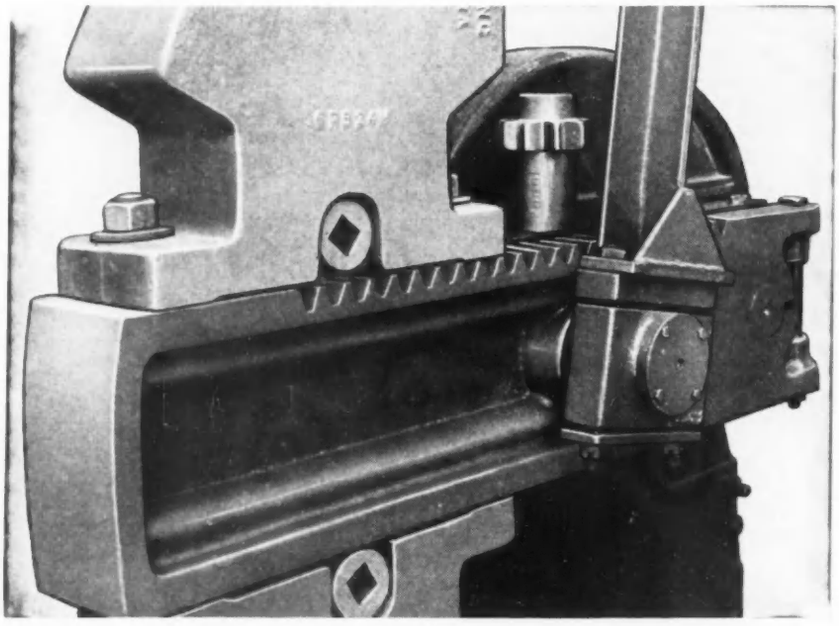
Winslow Engineering & Manufacturing Company

Large Single Element, Full-Flow Controlled Pressure Filter will replace Winslow's popular multi-element CP Filters. New full-flow CP filter is based on patented principle of having two flow rates in one element. It requires only one inlet and one outlet. The single-element CP filter is truly one element, not two tied together. It gives true full-flow, thus differing from so-called dual purpose filters where by-pass and full-flow elements are tied together with only a small segment of the unit being full-flow. Winslow single-element model reduces



all cost factors. With fewer lines to connect, installation time is at a minimum. Element replacement time is greatly reduced.

For more data on above item, circle E484 on postcard, Page 484



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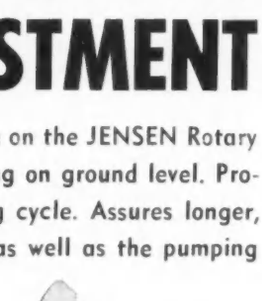
A simple adjustment of the rack and pinion system on the JENSEN Rotary Balanced JACK can be made by one man standing on ground level. Produces a smoother stroke throughout the pumping cycle. Assures longer, trouble-free service from sub-surface equipment as well as the pumping unit. Uses less power too! Investigate Jensen and let us fill you in on the benefits obtained by present users.



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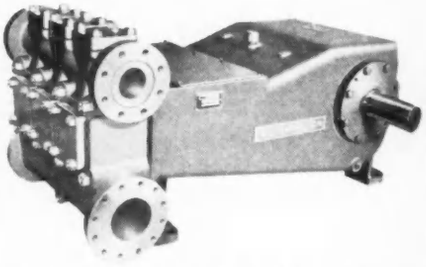
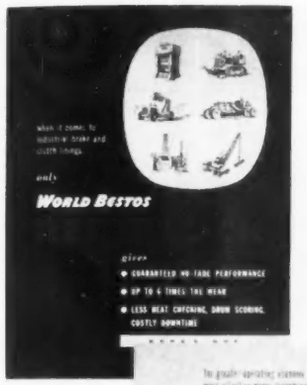


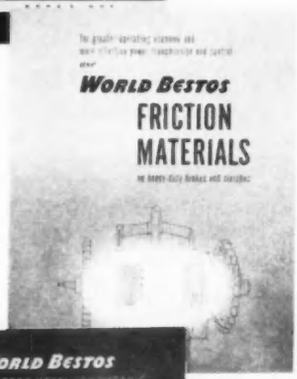
KFA Horizontal Triplex Plunger Pump reduces cost per horsepower. Two aluminum bronze liquid ends provide a large selection of plungers, overlapping at 3-inch diameter. Rated 350 rpm and 162 displacement horsepower, this unit comes with right or left hand crankshaft extension heavier than competitive models. Corrosion-resistant valve service of #316 stainless steel, is designed for critical suction conditions. Easy to drive out tapered suction valve seats, through access holes provided. Suction and discharge flanges on either side, are popular oil field pipe sizes, and don't need raised foundations. Easily removable, workbench repackable "magazine" stuffing boxes, are tightly sealed by "O" rings protected with double backup rings. So are discharge valve plugs. Both are secured by individual bolted valve covers and cylinder heads. Lubricator or lantern gland connections don't interfere when removing stuffing box cover. Plunger

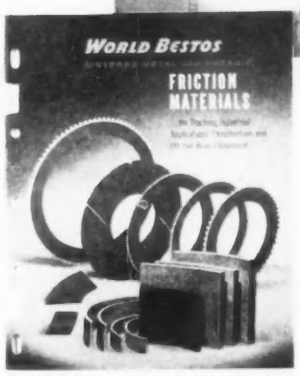
replacement is made simpler and cheaper with 2-piece design of corrosion-proof materials.

For more data on above item, circle E485 on postcard, Page 243

World Bestos





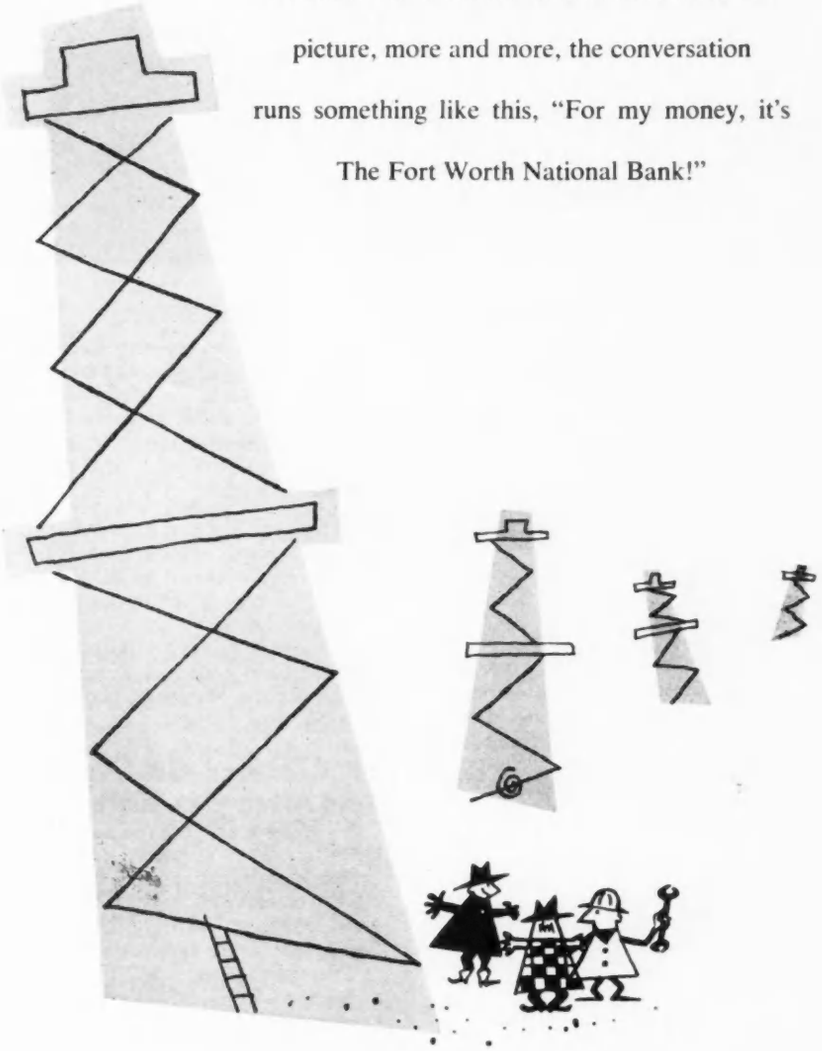


World Bestos Industrial Red Block Combination is now available for brake assemblies on drawworks, winches, hoists, cable control units and other heavy-duty power control and transmission equipment. Dry-mix, rigid-molded, Red Block segments in combination with "D" block segments insure fade-free braking with less pressure and heat, less danger of heat-checked drums and less maintenance. Over past 10 years, Red Block has won fame for guaranteed no-fade performance. It's widely used on off-the-road equipment. World Bestos also supplies sintered metal clutch facings to supplement complete line of Red Block friction parts. This extended coverage provides correct type of friction material needed for each heavy-duty clutch and brake assembly.

For more data on above item, circle E486 on postcard, Page 243

"wherever oil men gather"

For every oil man out in the far-flung fields there are several others backing him up in the many urban centers of oil activity. That's why when oil men get together, their conversation usually runs from the mundane to the urbane. And when financial matters enter the picture, more and more, the conversation runs something like this, "For my money, it's The Fort Worth National Bank!"



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Humble's Junior Achievement Winner Receives Award

Keith Funston, left, president of New York Stock Exchange, presents award for best annual report of 3,985 teen-age Junior Achievement companies in 39 states and two Canadian provinces to 18-year-old Allan Peterson, president of Metal Engineering Company of Houston, Texas. At right, Ralph J. Schilthuis, a vice president of Humble Oil & Refining Company. The first-place Junior Achievement company was sponsored by Humble.

Jade Oil Company Acquires Oil Operations, Inc.

The Jade Oil Company of California, has acquired all the assets of Oil Operations, Inc., of Galveston, Texas, in exchange for 135,342 shares of Jade common stock, according to an announcement by Jade President Johnny Mitchell.

Oil Operations, Inc., has 21 producing wells located in Fort Bend, Liberty and Jefferson counties, Texas. The wells are currently producing in excess of 6,000 barrels of oil per month. The company also has 12 proven undrilled locations.

Jade has acquired in the producing wells more than 700,000 barrels of oil. In addition, there are an estimated 400,000 barrels in the proven undrilled locations.

Monterey Agrees to Sell Business to Humble Oil

Monterey Oil Company has agreed to sell substantially all of its business and assets to Humble Oil & Refining Company according to an announcement made jointly late Tuesday by Howard C. Pyle, president of Monterey, and Morgan J. Davis, president of Humble. The net result of the transactions, said the Monterey president, will be the dissolution of Monterey and the making of liquidating distributions approximating an ultimate total of $42 per share to the Monterey stockholders, the major portion of which will be distributed immediately following the closing. The transaction will be closed at the earliest possible date but probably not later than February 1 of next year.

Monterey's principal properties are located in California and Texas. It also has production in Wyoming, Louisiana and New Mexico.

TP Coal and Oil Company Buys Acreage in Southwest

Acquisition by Texas Pacific Coal and Oil Company of producing properties and drilling locations totaling more than 25,000 acres principally in Lea County, New Mexico and Cochran County, Texas, has been announced.

The transaction, involving cash, stock, and oil payment considerations in excess of $16,000,000, involves properties formerly operated as Olsen Oils, Inc., Oklahoma City, and Jal Oil Company, Midland Texas, acquired by TP from R. Olsen of Oklahoma City.

Producing properties include 74 leases totaling 20,700 acres, on which are 228 gross producing oil and gas wells, with a current daily net average production rate of 1,020 barrels from 170 oil wells and 22 million cubic feet of gas and associated gas from 58 gas wells. The present wells are producing from a wide variety of formations, ranging from the Yates horizon at 3,500 feet to the Ellenburger below 12,000.

Spur Oil Company Plans Merger Into Murphy Corp.

C. H. Murphy, Jr., president of Murphy Corporation, El Dorado, Ark., and Henry D. Hinds, chairman of the board of directors of Spur Oil Company, Nashville, Tenn., have announced that the boards of the two companies have given preliminary approval for a merger of Spur Oil Company into Murphy Corporation.

The merger is subject to the approval of the stockholders of both companies at meetings to be held in the near future. If approved by the stockholders, it will be accomplished by an exchange of stock on the basis of seven-tenths of one share of Murphy common stock for each share of Spur common stock. Murphy's stock is listed on the American Stock Exchange and Spur stock has been widely traded in the over-the-counter market. Murphy presently has approximately 3,000 stockholders and Spur, 5,600.

Universal Production Is Newly Formed Petroleum Firm

Universal Production Service, Inc., a new petroleum industry concern headquartered in Midland, Texas, is headed by Harry H. Lawson, internationally-known oil man, as president.

This independent organization is staffed to drill, test, complete and produce oil and gas wells — including preparation and filing of all necessary reports to regulatory bodies—strictly on a contract, custom basis.

H. H. Lawson

This type of service is designed to—and will—assist producers in adopting economic programs relative to meeting current and future problems in developing and operating proven oil and gas properties.

Other officials of Universal Production are Lamar Eschberger, executive vice president; Everett L. Smith, secretary-treasurer, and Archie P. Parr, field superintendent.

Sinclair Oil Forms New Electronics Department

A special department has been formed by Sinclair Oil Corporation to coordinate the expanding electronic data processing and computing activities of its operating subsidiaries. The new Electronics Department will integrate individual electronic operations to serve over-all corporate needs at minimum cost.

Dr. K. A. Smith is manager of the new department, and A. J. Piemonte is coordinator of data processing.

Dr. Smith has served in research and managerial positions with Sinclair Re-

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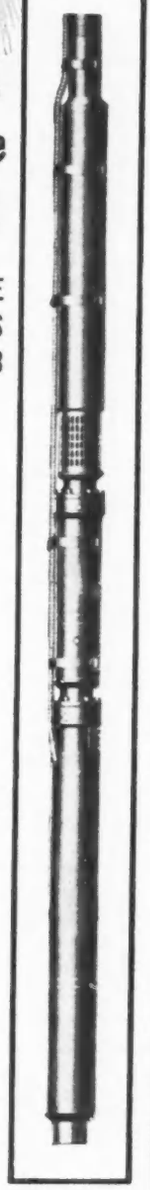

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search Laboratories, Inc., in Harvey, Ill. He was most recently director of the economics analysis division.

Piemonte, who has been data processing coordinator in the Comptroller's Department, has had wide experience in all phases of Sinclair's accounting operations.

Continental Oil Company Makes Oklahoma Purchases

Continental Oil Company has purchased oil properties in Oklahoma owned by the Dick Wegener and Clyde E. Davis Interests of Oklahoma City. The purchase involved a total of $1,260,000, including $160,000 in cash and $1,100,000 in reserved oil payments, according to the announcement.

The properties include 62 oil wells and 12 gas wells on 48 producing and four non-producing leases located in North Central and South Central Oklahoma in Stephens, Kay, Noble, Grady, Garvin, Love, Carter and Oklahoma counties. These wells are currently producing at the daily rate of approximately 200 barrels of oil. Over 50 percent of the reserves involved in the purchase are in the Doyle and East Velma fields in Stephens County. The properties will be operated by Conoco's Central Region, headquartered in Oklahoma City.

Nordon Corporation, Ltd. Acquires California Property

Nordon Corporation, Ltd., Los Angeles, has acquired developed and undeveloped property and 60 producing wells in California formerly owned by Barratt & Bysshe and Cleveland Oil Co. The properties are located in Kern, Los Angeles, Ventura and Orange counties.

Oil reserves under the undeveloped sectors are estimated by Lewis & Ganong, petroleum engineers and geologists of Bakersfield, Calif., at about 5 million barrels.

The wells reportedly are producing approximately 600 gross barrels of 14 to 35 gravity oil per day.

Fifty-one of the wells were formerly owned by Barratt & Bysshe and nine by Cleveland Oil Co. They are located in the following fields: Huntington Beach, Sunset Heights, Wilmington, Rosecrans, Placerita, Bardsdale, Kern River, Edison, and Race Track Hill.

Gulf Oil to Establish New Department in Houston

A new organization, the Domestic services Department, is being established in Houston by Gulf Oil Corporation. The department will be responsible for the handling of all advisory and service elements for domestic operations including data processing, employee relations, insurance, law, public relations, purchasing, tax, treasury and Houston headquarter office services.

K. E. Rotegard, who has been appointed Manager of the newly formed unit, has been financial and services coordinator, domestic production, in Houston since July 1959.

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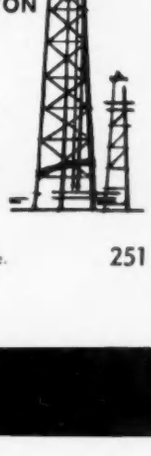

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Men in the industry

H. S. M. Burns

M. E. Spaght

W. K. Whiteford

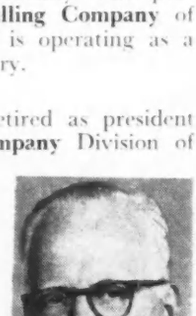
E. D. Brockett

Monroe E. Spaght has been elected president of **Shell Oil Company** to succeed **H. S. M. Burns,** who will retire at the end of this year. Spaght, who started his career with Shell as a research chemist, has been an executive vice president since 1953. Before that, he was president of Shell Development Company, Shell's research affiliate. Burns became president of Shell in 1947. He has been active in the petroleum industry, serving as a director and chairman of the American Petroleum Institute, and president of the Fifth World Petroleum Congress.

A. R. Ratti has been promoted to assistant land superintendent for **Continental Oil Company's** southwestern region. He will headquarter in Fort Worth and succeeds **Hanes M. Dawson,** who was promoted to western region land superintendent at Los Angeles.

David K. Gunderson has been named vice president and general manager of **Double-A Drilling Company, Ltd.,** in Calgary. Double-A recently was purchased by **Llano Drilling Company** of Midland, Texas, and is operating as a wholly-owned subsidiary.

T. M. Martin has retired as president of the **Lion Oil Company** Division of **Monsanto Chemical Company** and as vice president and director of **Monsanto Chemical Company.** Martin joined Lion Oil Company in 1929 as vice president and director, became executive vice president in 1939, and president in 1947. When Lion merged into Monsanto in 1955, he assumed his vice presidency and directorship.



T. M. Martin

John B. Vallely and **G. Gary Brown** recently opened petroleum engineering consulting offices in Bakersfield, Calif., using the firm name, **Vallely & Brown.** Handling all phases of petroleum engineering, the firm is placing emphasis on production engineering and management, reservoir analysis and secondary recovery operations.

W. K. Whiteford, president of **Gulf Oil Corporation** since 1953, has recently been elected chairman of the board of directors for Gulf. Whiteford succeeds **Ralph O. Rhodes** who recently reached retirement age. Whiteford will continue as chief executive officer and Rhodes will remain on the board of directors. At the same time, **E. D. Brockett,** formerly executive vice president, was elected president of Gulf Oil. Additionally, Brockett will be vice chairman of the executive committee.

Charles E. Finberg, vice president of **Speedway Petroleum Corporation,** has been appointed to the **Michigan Historical Commission** for a term expiring May 21, 1966.

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CASPER, WYOMING—C. A. White 3-5264
FULLERTON, CALIFORNIA—Dyna-Log .. LA 6-1184
GLENDIVE, MONTANA—C. A. White ... EM 5-3833
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Horne Well Service Co. 3-5396
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Davis-Kemp Tool Co., Inc. 5541
LIBERAL, KANSAS—Rainbo Service ... Main 4-3598
LINDSAY, OKLAHOMA
Rainbo Service Co. ..... PL 6-2530
MIDLAND, TEXAS
Luccous Service & Eqpt. Co. ..... MU 2-8311
NATCHEZ, MISSISSIPI
Davis-Kemp Tool Co., Inc. 2-3021
NEW IBERIA, LOUISIANA
Klein-Deco Wire Line Service ..... EM 9-6632
OKLAHOMA CITY, OKLAHOMA
Rainbo Service Co. ..... ME 4-2131, ME 4-0105
STERLING, COLORADO
Cable Drilling, Temp. & Well Serv. Co. . LA 2-4761
VIDALIA, LOUISIANA
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Kline Wire Line Co. ..... OX 3-2731
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WICHITA FALLS, TEXAS
Hudson-Eads, Inc. 322-8584
WILLISTON, N. DAKOTA
C. A. White ..... GR 3-6555

Men in the industry

Earle F. Taylor, Glen R. Neighbors and **Stewart H. Folk** have announced the formation of **Taylor and Associates, Incorporated,** a consulting firm with offices in Houston. The three geologists formerly worked exclusively for Tennessee Gas Transmission Company, Union Texas Natural Gas Corporation, Lion Oil Company and Murphy Corporation in an advisory capacity.

J. W. (Jack) Hinckley has been elected vice president of **Petroleum Property Management, Inc.,** Dallas. The new company is devoted to economical supervision of primary and secondary production operations in the Southwest on a contract basis. The announcement was made by **H. J. Gruy,** president of Petroleum Property Management, Inc.

J. W. Hinckley

George E. Summers, Jr., Edward L. Mueller and **John R. Dyer** have discontinued their geological consulting firm of **Summers, Mueller & Dyer,** Bismarck, N. D. Summers and Dyer will operate as **Summers & Dyer,** located in the Professional Building, Bismarck. Mueller will continue his activities in the Williston Basin independently.

Dr. Carl Gatlin, specialist on drilling and oil well completion, is the new **University of Texas** Petroleum Engineering Department chairman. Gatlin succeeds **Dr. George H. Fancher** who has become vice president in charge of production research for an oil company in Tulsa.

Herman G. Biederman has been appointed division office manager for **Sun Oil Company's** Mid-Continent Production Division. Biederman succeeds retired **Horace B. Arnold.**

James T. Wood, Jr., senior vice president and chief executive officer at Los Angeles for **Texaco Inc.,** has retired under the company's pension plan after more than 30 years of Texaco service.

Frank Gaines, Jr., has joined the headquarters of **Humble Oil & Refining Company** as coordinator of executive development and organization planning.

A. R. Ratti has been promoted to assistant land superintendent for **Continental Oil Company's** Southwestern Region. Ratti succeeds **Hanes M. Dawson** who was promoted recently to Western Region land superintendent at Los Angeles. Ratti headquarters in Fort Worth.

J. R. Riggs has been appointed methods research project manager at Dallas for **Socony Mobil Oil Company, Inc.**

George O. Relf, Jr., has been elected administrative vice president for **Gulf Oil Corporation.** Relf succeeds **Newby C. Simpson** as coordinator of the Production Department. Simpson has become manager of Gulf's production operations in Libya. Relf began his career with Gulf in 1937 as a geologist with the **Mene Grande Oil Company** in Venezuela.

G. O. Relf, Jr.

Alvin J. Pearson, formerly a senior reservoir engineer for Atlantic Refining Company, has joined the oil and Public Utilities Loan Division of **Continental Illinois Bank and Trust Company** in Chicago as petroleum engineer.

E. E. Hall, formerly manager of Southern Natural Gas Company's Land Department in New Orleans, has joined **Dixilyn Drilling Corporation** as manager of Dixilyn's new Exploration Department. Offices are in the Saratoga Building, New Orleans.

J. K. Lydecker, division geologist with **Sinclair Oil & Gas Company's** West Texas Division at Midland, has been named division exploration superintendent for Sinclair's division headquarters at Fort Worth.

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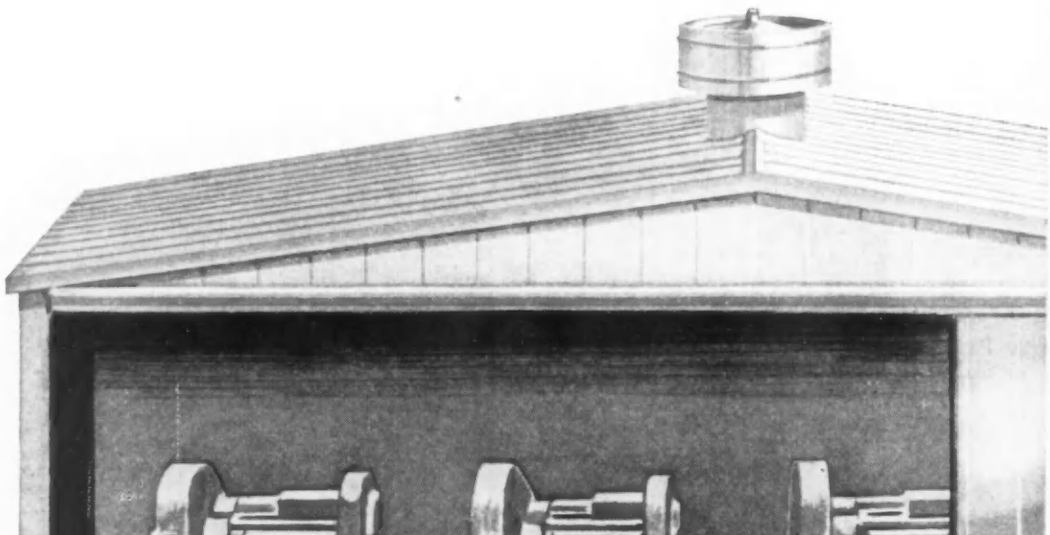

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Capacities: 100 to 9,565 BPD
Plunger Loads: 3,580 to 10,000 lb
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BETHLEHEM STEEL

BETHLEHEM STEEL SUPPLY DIVISION

Men in the industry

E. P. Neal, formerly vice president and division manager of the Mid-Continent Division, Tulsa offices of **Kirby Petroleum Company,** has become a consultant in oil and gas development in Tulsa. He will retain Kirby's Mid-Continent Geological Department in Tulsa, conducting Kirby's lease and royalty business.

E. P. Neal

S. K. Van Steenbergh, division exploration superintendent for the South Texas-Houston Division of **Sinclair Oil & Gas Company,** has been named to a similar post with the Central-Tulsa Division. He succeeds **D. L. Dobie** who was appointed assistant manager of the Central Division. Also, **Robert W. Bayliss** has been promoted from senior landman to staff landman with the Central Division.

John R. McNulty, vice president, Industrial Relations of **Canadian Husky Oil Ltd.,** has been appointed consulting associate for **Industrial Relations Counselors Service, Inc.**

Marion J. Epley, Jr., formerly vice president and assistant to the chairman of the board, **Texaco Inc.,** has been named senior vice president in charge of worldwide sales. Also, **Kerryn King,** formerly vice president in charge of Employe and Public Relations, has been named vice president and assistant to the chairman. **Ben Halsell,** formerly director of advertising and sales promotion, has been elected vice president in charge of the Employe and Public Relations Department.

Lawrence A. Kimpton has joined **Standard Oil Company (Indiana)** as general manager of planning, a new position. Kimpton will report to President **John E. Swearington,** and will supervise activities concerned with long range planning and industry and general economics. He will continue as a member of Standard's board of directors.

Z. D. Grissom, district manager for **Sinclair Oil & Gas Company** in Alaska, was promoted to division exploration superintendent for Sinclair's South Texas-Houston Division. Also, **R. R. Gahring,** senior geologist at Anchorage, Alaska, was promoted to district manager to succeed Grissom.

S. G. Sanderson has been elected president of **Stekoll Petroleum Corporation. Marion H. Stekoll** will remain with the company as chairman of the board of directors. Sanderson was formerly associated with Gulf Oil Corporation.

C. J. Livingstone has been appointed an associate director of research, in charge of product research, development and testing, for **Gulf Research & Development Company.**

Wayne H. Dean has become affiliated on a full time basis with **Perforaciones Marinas Del Golfo, S. A. (Permargo),** a Mexican drilling company organized to operate a drilling rig on a platform for the Pauley interests in Mexico. Wayne formerly was executive vice president and director of Zapata Off-Shore Company. Dean has acquired Zapata's interests in Permargo.

Charles H. Dodson has been elected vice president in charge of **Texaco Inc.'s** Midwest operations with headquarters in Chicago. **John I. Mingay** succeeds Dodson as general manager of the company's Domestic Sales Department. Mingay, prior to his newest promotion, was assistant general manager of the Marine Department. **Marvin E. Lundfelt,** formerly manager of Operations Division of the Marine Department, succeeds Mingay.

T. B. Kimball

C. J. Allen

Thomas B. Kimball, already a director, has been elected executive vice president-Operations, **Sinclair Oil Corporation.** Also, **C. J. Allen,** since 1957 a vice president of Sinclair Oil Corporation, has been elected president and chief executive officer of **Sinclair Refining Company,** succeeding Kimball.

Tom Bolack, independent oil, gas and mining operator, director, **Petro-Atlas Corp.** and Hidden Splendor Mining Company, Farmington, N. M., has been awarded by the **Free Enterprise Awards Association, Inc.,** the FEAA's **1960 American Success Story Award,** as an example of the success possible under American free enterprise democracy. Ten other business men in various phases of business also were recipients of the award.

Albin Diby Hunt and **Stan Adam Kanik,** both of Calgary, Alta., have been appointed to the oil and gas administration staff of the **Resources Division, Northern Administration Branch, Department of Northern Affairs and National Resources.** Hunt will be administrator of the oil and gas resources administered by the Department, and Kanik will be petroleum lands evaluation officer.

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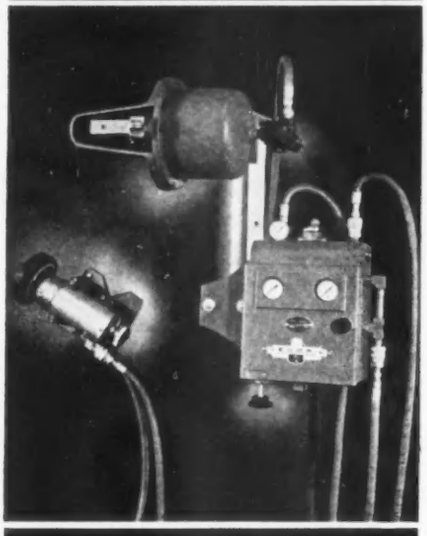

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Men in the industry

John M. Sprague has been named Washington, D.C., representative for **Humble Oil & Refining Company.** Before taking this Washington post, Sprague had served as controller, area manager, and regional vice president of **The Carter Oil Company,** now **Carter Division of Humble.**

Jack W. Williamson has been appointed managing editor of the *Association of Oilwell Servicing Contractors News* by the executive committee of the *AOSC.*

Herbert F. Beardmore, of Houston, has been elected a vice president of **Gulf Oil Corporation.** Beardmore will be in charge of production operations in the United States and will make his headquarters in Houston. He succeeds **Robert L. Boggs** who has retired after 33 years of service with Gulf, 22 of which were spent in foreign operations.

H. F. Beardmore

Luke S. Gournay, senior research physicist for **Socony Mobil's** Field Research Laboratory, Dallas, has been awarded the **1960 Socony Mobil Incentive Fellowship.** Gournay has enrolled in the University of Colorado's Graduate School where he will seek a Ph.D degree in physics.

Jason Cooper, Jr., has been named employe relations manager by the **Esso Standard Division, Humble Oil & Refining Company. J. Edwin Hughey,** acting employe relations manager has become administrative assistant to Esso President **William W. Bryan.**

John N. Klemer, Bismarck, N.D., geological consultant, has joined the firm of **Harris & Brown,** Consulting Geologists as general partner. The expanded firm will now be known as **Harris, Brown & Klemer,** with offices in the Provident Life Building, Bismarck, N.D.

R. B. Thompson has been named manager, Technical Department; **R. E. Turkleson** was named manager Production Department, and **W. E. McKellar, Jr.,** was named manager, Employe Relations Department for **Socony Mobil Oil Company's** newly created operating division **Mobil Chemical Company** at the Beaumont, Texas, installation.

Millard E. Stone, vice president in charge of Industrial Relations, has been named to head the new enlarged management development and personnel coordination program for **Sinclair Oil Corporation** and its operating subsidiaries. Stone's new title will be vice president in charge of Employe and Community Relations.

WHO'S MEETING WHERE

Dec. 8	Public Affairs Conference, Sponsored by West Texas Oil Information Committee of the Texas Mid-Continent Oil & Gas Association, Midland Women's Club, Midland, Texas.
9	Fifth Annual Program on "Mineral and Tidelands Law," Tulane University Law School, Tulane University, New Orleans.
Jan. 9–13	SAE International Congress and Exposition, Cobo Hall, Convention Center, Detroit.
17–19	ISA WINTER Instrument-Automation Conference & Exhibit, Sheraton-Jefferson Hotel and Kiel Auditorium, St. Louis, Mo.
20	Natural Gasoline Association of America, Gulf Coast Regional Meeting, The Robert Driscoll Hotel, Corpus Christi, Texas.
22–24	Kansas Oil Men's Association, Forty-Sixth Annual Convention, Broadview Hotel, Wichita, Kan.
Feb. 5–10	ASTM Committee D-2 Meeting, Benjamin Franklin Hotel, Philadelphia, Pa.
8–10	The Southwestern Legal Foundation, Twelfth Annual Institute on the Law of Oil, Gas and Taxation, Southwestern Legal Center, Dallas
24	Natural Gasoline Association of America, South Louisiana Regional Meeting, Lafayette Petroleum Club, Lafayette, La.
26 to Mar 2	Society of Petroleum Engineers of AIME Annual Meeting, Chase & Park Plaza Hotels, St. Louis, Mo.
Mar. 5– 9	ASME Gas Turbine Power Conference & Exhibit, Co-Sponsored by U.S. Department of Defense, Shoreham Hotel, Washington, D.C.
8–10	API Division of Production, Southern District Meeting, Captain Shreve & Washington-Youree Hotels, Shreveport, La.
13–17	National Association of Corrosion Engineers, Annual Meeting & Corrosion Show, Hotel Statler, Buffalo, N.Y.
15–17	Natural Gasoline Association of America, 40th Annual Convention, Baker Hotel, Dallas.
22–24	API Division of Production, Southwestern District Meeting, Cole Hotel, Albuquerque, N.M.
27–29	Midwest Gas Association, Annual Meeting & Convention, Sheraton-Fontenelle Hotel, Omaha, Neb.
April 4– 5	Gas Compressor Institute, Southwest Kansas Center, Liberal, Kan.
5– 7	API Division of Production, Mid-Continent District Meeting, The Mayo Hotel, Tulsa.
9–13	ASME Oil & Gas Power Conference & Exhibit, Jung Hotel, New Orleans
20–21	Society of Petroleum Engineers of AIME, East Texas-Lou-Ark., Gas Technology Symposium, Site Unreported, Tyler, Texas.

Nomads' Chapter monthly meeting: Los Angeles, second Wednesday, Biltmore Hotel, Wallace A. Sawdon, Secretary. Houston, second Monday, Ye Old College Inn, Elbert T. Walker, Secretary. Dallas-Fort Worth, first Monday, Greater Dallas Club, Hank Davis, Secretary. Tulsa, Hotel Tulsa, Gilbert Swift Secretary. New York, first Monday, Hotel Biltmore, Jesse E. Hickman, Secretary.

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A NEW HIGH STRENGTH ROD WITH A JOINT TO MATCH

Now available—a new undercut sucker rod pin specifically designed to take advantage of the strength of the body of the new Type 4 Sucker Rod.

By stress relieving (undercutting) the pin shank, the stress concentration point of the runout thread where pins tend to fail is eliminated.

Available with rolled threads on special order. Also available with conventional API pin.

CHEMICAL ANALYSIS

Carbon	Manganese	Silicon	Chromium	Molybdenum
.39/.46	.65/1.10	.20/.35	.75/1.20	.15/.25

TYPICAL PHYSICAL PROPERTIES

Yield psi	Ultimate psi	% Elong. 2″	% Red. Area	Brinell	Izod
105,000	127,000	22	55	255	70

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Associations

Honored for Disinguished Service

Morgan J. Davis (left center), president, Humble Oil & Refining Company, Houston, and Joseph S. Morris (right center), Allen & Morris Drilling Company, San Antonio, were named as 1960 recipients of Texas Mid-Continent Oil & Gas Association's Distinguished Service Awards. Presenting the award to Davis is Maston Dixon (far left), board chairman, Southern Minerals Corp., Corpus Christi. J. L. Latimer (right), senior vice president, Mobil Oil Company, Dallas, presented the award to Morris.

Indiana-Kentucky Society Elects Five New Officers

The Indiana-Kentucky Geological Society recently met and elected new officers. The new officers elected are as follows: Fred Forward, Phillips Petroleum Company, president; Jim Kendall, Kendall-Davis Drilling Company, vice president; Robert B. Sublett, W. C. McBride, Inc., secretary-treasurer; John Avila, Ryan Oil Company, executive committee, and Dan Sullivan, Indiana Geological Survey, executive committee.

Aitken Named President Of Rocky Mountain Association

Leonard L. Aitken, Denver oilman, has been elected president of the Rocky Mountain Oil and Gas Association. He succeeds Frank H. Gower, and takes over the reins of the mountain states' oil industry group immediately.

Aitken has served on the Association's Executive Committee for many years and November 1959, was elected vice president for Colorado. In addition, he has served on three of the Association's key committees, Legal, Legislative and Public Lands. In addition to his active membership in Rocky Mountain Oil and Gas Association, he is also a member of the Independent Petroleum Association of America and the American Petroleum Institute.

Grant A. Brown, Utah Oil Refining Company, was elected vice president for Utah; Warren A. Morton, Wyoming independent oil operator, was re-elected vice president for Wyoming and South Dakota of the Rocky Mountain Oil and Gas Association; Ralph W. (Rusty) Gemmer, Montana oilman, was re-elected vice president for Montana; Walter W. Wittlinger, Wyoming oil producer, was re-elected treasurer; Samuel Butler, Jr., president of Sharples Oil Corporation, Denver, was elected vice president for Colorado, and James L. Parmelee, Northern Natural Gas Company, Omaha, was re-elected to his second term as vice president for Nebraska of the Rocky Mountain Oil and Gas Association.

M. J. Rathbone

Gage Lund

API Re-Elects Frank Porter And Four Vice Presidents

Frank M. Porter was re-elected as president of the American Petroleum Institute by the board of directors at the recent Chicago meeting. Four new vice presidents were also elected. M. J. Rathbone, president of Standard Oil Company (New Jersey), was also re-elected as chairman of the board of directors.

Frank M. Porter

P. C. Spence, Sinclair Oil Corporation, New York, was re-elected institute treasurer, and William M. Wilson of the API staff was re-elected secretary. Other officers elected were: Gage Lund, Standard Oil Company of California, elected vice president in the division of production; A. P. Frame, vice president and director of Cities Service Company, elected vice president in the division of refining; Vernon A. Bellman, director Socony Mobil Oil Company, Inc., and vice president-marketing, Mobil Oil Company, is the new vice president for marketing, and A. O. Savage, comptroller of Standard Oil Company (New Jersey), was elected vice president in the division of finance and accounting.

Petroleum Writers Elect Billy Thompson President

Billy Thompson of The Houston Post, Houston, has been elected president of the Association of Petroleum Writers. Thompson succeeds J. Richard Shaner of Petroleum Week, New York. Thompson had served during the past year as vice president of the APW.

Leslie Rowland, of Oil in Canada, Winnepeg, Can., was chosen vice president; Ted Armstrong, Oil and Gas Journal, Tulsa, was elected secretary-treasurer, and Shaner was named to the post of chairman of the Executive Committee. Joan Gaston, Independent Petroleum Association of America, Tulsa, was elected assistant secretary-treasurer.

Members of the Board of Directors of the APW for the next year will include the following: Don Kliewer, World Oil, Houston; Al Raymond, Montana Oil Journal, Great Falls; Raymond E. Bjorkback, Oilgram, New York; Olivia Starken, Tri-State Oil Report, Evansville, Ind.; Joseph Huttlinger, oil columnist, Washington, D.C.; Oliver C. Klinger, Oildom Publishing Co., Bayonne, N.J.; Bill Bachman, Oil and Gas Journal, Tulsa; Bill Uhl, World Petroleum, New York; Sam Kiefner, The Wichita Eagle and Beacon, Wichita, Kans.; Will Branan, Oil, New Orleans; Jim Collins, The Oil Daily, Washington, D.C.; Mac Sebree, United Press International, Tulsa; Joe Webb, Petroleum Engineer, Dallas, and Harry Heinecke, The Star-Telegram, Fort Worth.

Houston Desk and Derrick Elects Heise President

Myrtle Heise, secretary to manager, Gas Department, Humble Oil & Refining Company, has been elected president of the Desk and Derrick Club of Houston for 1960-1961. A member of the Houston club since 1952, Miss Heise is serving as first vice president during the current year.

Other officers elected for the fiscal year which began October 1, 1960, are: Eleanor Wirfel, King & Heyne, first vice president; Elizabeth Rockwell, Gulf States Asphalt Co., Inc., recording secretary, Margaret Gust, Superior Oil Co., corresponding secretary, and Claudia Branch, Atlas Pipe, Inc., treasurer.

Directors elected for two year terms are: Virginia Renick, D. C. Cheesman and Son; Alberta Riesen, Schlumberger Well Survey Corp.; Margaret Weyer, Baker Oil Tools, Inc., and Ramelle Trimble, King & Heyne.

Sophie Edmundson, H. S. McQueen, president during the current year, will serve as board advisor for the next year.

Associations

Los Angeles AAODC Chapter Names Officers for 1961

The Los Angeles Chapter of the American Association of Oilwell Drilling Contractors elected new officers at their directors meeting recently. Those elected were John S. Hagestad, vice president; Norman Haney, chairman; Carl T. Gates, vice chairman, Los Angeles Basin; John McEwen, vice chairman, Ventura; James Armstrong, vice chairman, San Joaquin Valley, and Charles E. Reimann, secretary, Los Angeles Chapter.

California national directors elected are: E. C. Brown, honorary; K. L. Kellogg, honorary; W. W. Cline, H. A. Buchanan, Tine Gaiser, H. M. Gallagher, Bates, Hagestad, A. J. Heiser, H. H. Hillman, H. H. Madley, McEwen, Robert B. Montgomery, William D. Tetsch, R. O. Turner, S. I. Williams and F. A. York.

New Officers Elected by Kentucky Oil & Gas Ass'n.

The Kentucky Oil & Gas Association recently elected the following as the association's new officers: E. E. Clark, vice president of Kentucky West Virginia Gas Company, president; John Capito, vice president of United Producing Company, vice president; George Hoffman, independent, vice president; E. A. Owens, Ashland Oil & Refining Company, vice president; Angus McDonald, McDonald, Alford & Roszelle, secretary, and Robert Reilly, Kentucky Oil & Gas Association, executive secretary.

1961 Officer-Nominees Announced By AAPG

Mason L. Hill, Richfield Oil Corporation, Los Angeles, and Harold T. Morley, Pan American Petroleum Corporation, Tulsa, head the slate of officer nominations submitted by the American Association of Petroleum Geologists Nominating Committee for 1961.

Other 1961 officer-nominees include, for vice president, J. Ben Carsey, Humble Oil & Refining Company, Houston; Ralph W. Edie, consultant, Calgary, Alta., and William J. Hilseweck, consultant, Dallas. For secretary-treasurer, George V. Cohee, United States Geological Survey, Washington, D. C., and for editor, Grover E. Murray, Louisiana State University, Baton Rouge.

Petroleum Committee of ASME Names A. C. Smith President

Alva C. Smith, senior mechanical engineer for Mid-Continent Pipeline Company, has been named president of the Petroleum Activities Committee. In its second year of operation, this committee is under the sponsorship of the Mid-Continent Section of the American Society of Mechanical Engineers and was formed to provide better exchange of engineering information relating to the petroleum industry between all interested persons.

John W. Towner, chief design engineer for D-X Sunray Oil Co., is the secretary; Herbert Graham, sales representative for the Cooper-Bessemer Co., has been named treasurer, and Joe A. Goodnough, sales representative for the Clark Brothers Co., is chairman of the meetings arrangements. Ten other Tulsa mechanical engineers have accepted committee assignments.

Program chairman for the four principal petroleum industry divisions are W. R. Clarke, manager of production equipment sales for Jones & Laughlin Supply Div., production and drilling; M. J. Peterson, chief engineer for Oklahoma Natural Gas Co., natural gas industry; H. T. Chilton, Jr., maintenance superintendent for Service Pipeline Co., petroleum transportation, and C. P. Stanley, vice president of Dresser Engineering Co., petrochemical and refining.

Earl Seaton, editor of *Oil and Gas Equipment Magazine*, is the news committee chairman, and Robert L. Smith, senior mechanical engineer for Sinclair Oil & Gas Co., is chairman of the publicity committee. In charge of out of town attendance is Harry W. Evans, assistant superintendent of engineering for Sinclair Oil & Gas Co.

OILFIELD TRUCK AND FLOAT

Thornycroft Sandmaster 252" wheel base Oilfield Truck. Hands-England full Oilfield Body. 60,000 lb. winch, heavy duty gin poles, winch operated gin pole risers and folding SAE king pin.

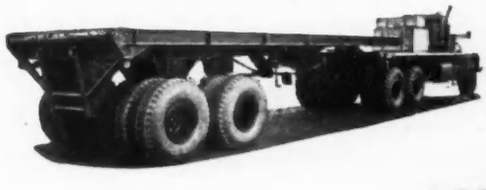
Hands-England 75,000 lb. capacity, tandem axle Oilfield Float 30' 0" long and 9' 6" wide, folding support legs and inverted 36" fifth wheel.

Truck and Float on Michelin 18.00 x 25. Sahara "X" sand tires.

OILFIELD TRANSPORTATION EQUIPMENT

OILFIELD FLOAT

Hands-England 75,000 lb. capacity tandem axle Oilfield Float 30' 0" long and 8' 6" wide, folding support legs and inverted 36" fifth wheel. Float on 11.00 x 20 — 14-ply tires.

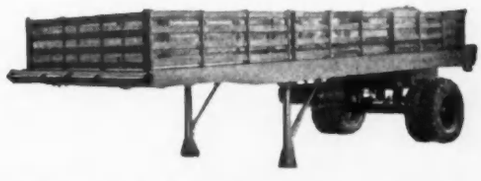


OILFIELD TRUCK AND FLOAT

Scammel Constructor 261" wheel base Oilfield Truck.

Hands-England 75,000 lb. capacity tandem axle Oilfield Float 30' 0" long and 9' 6" wide, folding support legs and inverted 36" fifth wheel.

Truck and Float on 14.00 x 20—18-ply tires.



OILFIELD FLOAT

Hands-England 25,000 lb. capacity single axle Oilfield Float 24' 0" long and 8' 0" wide, folding support legs and SAE king pin 11.00 20—12-ply tires. Steel stake sides.

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B.M.I.

Associations

Mid-Continent Adds 17 To Interstate Oil Commission

Texas Mid-Continent Oil & Gas Association has named 17 Texas oil men to its Advisory Committee to the Interstate Oil Compact Commission.

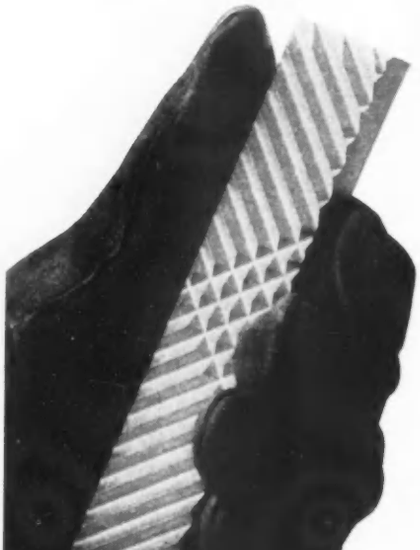
Those re-appointed were Committee Chairman Curtis G. Condra, Pan American Petroleum Corp.; Perry R. Bass, Richardson & Bass, Fort Worth; J. H. Dunn, Shamrock Oil & Gas Corp., Amarillo; W. J. Goldston, Goldston Oil Corp.; Herman Pressler, Humble Oil & Refining Co., Houston; J. L. Sewell, Delhi-Taylor Oil Corp., Dallas, and Frank P. Zoch, Jr., Turnbull & Zoch Drilling Co., Corpus Christi.

New committee members named were Neville Penrose, Neville G. Penrose, Inc., Fort Worth; W. Dow Hamm, The Atlantic Refining Co., Sherman Hunt Empire Drilling Co., and Gordon Simpson, General American Oil Co. of Texas, Dallas; P. W. Pitzer, Jr., Pitzer and West, Breckenridge; J. Clyde Tomlinson, Longview; R. C. Tucker, Great Western Drilling Co., Midland; Harold Skinner, Continental Oil Co., Charles W. Alcorn, Falcon Seaboard Drilling Co., and Robert L. Boggs, Gulf Oil Corp., Houston.

"Matched Tools for Unmatched Performance"

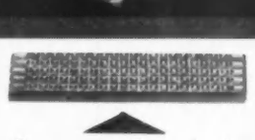
Web Wilson Sabre-Tooth Tong Dies

GRIP SECURELY-- TIME AFTER TIME



Choice of the industry, Sabre-Tooth Tong Dies are made from *triple-alloy* steel, heat treated in an advanced, carefully controlled process which adds carbon for a *hard exterior*, but leaves a tough resilient core. Angular teeth prevent deep biting, which protects the pipe. The *reversible feature* means longer die life. Corrosion is resisted by cadmium plating. Available for all sizes of tongs.

■ Specify *Web Wilson Sabre-Tooth Tong Dies* on your next order, and you too will recognize why they are the preference of the majority.



The popular Tiger Tooth Tong Die meets the same high metallurgical standards and is cadmium plated for corrosion protection.

"Jiffy" Tong-Die Driver and Slot Conditioner with its overhanging protective shield prevents flying chips, and automatically cleans the slot for the new die.

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General Offices: Houston, Texas

Pacific Coast API Elects 1960-61 Production Officers

The American Petroleum Institute Division of Production, Pacific Coast District elected 1960-61 district officers at the business meeting of the recent annual meeting at Los Angeles. The new officers are: F. E. Schoonover, Monterey Oil Company, chairman; C. M. Shields, Standard Oil Company of California, vice chairman, Los Angeles Basin; Jack Fillman, Shell Oil Company, vice chairman, Coastal Area; E. E. Nichols, Richfield Oil Corporation, vice chairman, San Joaquin Valley; C. K. O'Neill, Gardiol, Inc., vice chairman, Coalinga-Kettleman; C. R. Ball, Ball & Black Supply Company, treasurer, and Mrs. Elsie M. Edmiston, American Petroleum Institute, secretary.

F. T. Lloyd, Richfield Oil Corporation, and G. L. Laurent, Standard Oil Company of California, also were elected as chairman and vice chairman, respectively, of the Advisory Committee.

Colorado Petroleum Council Names Charles A. Rothfus

Charles A. Rothfus has been appointed executive vice president of the Colorado Petroleum Council succeeding A. C. Bill Rose who has resigned.

Rothfus has served for the past two years as assistant secretary of the Kansas Petroleum Industries Committee, headquartered in Wichita. Prior to the consolidation in 1958 of the American Petroleum Institute's public and governmental affairs branches, Rothfus served as a district representative in Kansas and Oklahoma for the API's Oil Information Committee with offices in Tulsa.

D. C. Fleming Chairman For Kansas Committee

D. C. Fleming, division manager of Skelly Oil Company, Wichita, was elected chairman of the Kansas Petroleum Industries Committee at a meeting of the executive committee.

Named as vice chairmen were: W. B. Dalton, owner of the Kansas Oil Company, Topeka, and R. L. Williams, president of Imperial Oil of Kansas, Wichita. C. E. Holmes, Wichita, is executive secretary of the organization.

Retiring officers are: H. E. Zoller, secretary-treasurer of Jet Drilling Company, Inc., Wichita, chairman, and D. M. Liles, area superintendent of Pan American Petroleum Corporation, Ulysses, vice chairman. The second vice chairmanship had been vacated earlier by the retirement of J. D. Phillips, Wichita, former division manager of Phillips Petroleum Company.

At the same meeting, the executive committee honored two oil men for their work on behalf of the oil industry in Kansas. They were J. C. Dunlop, recently retired district manager of Mobil Oil Company, Wichita, and A. H. Robinson, district superintendent, United Producing Company, Inc., Satanta.

Suppliers' notes

J. R. Lesch

J. Z. Brewer

A. G. Davis

W. A. Kistler, Jr.

James R. Lesch has been appointed to the newly created post of general product manager for **Hughes Tool Company.** Lesch, formerly product manager, rock bits, will now head up a staff responsible for reviewing and coordinating marketing programs, evaluating and controlling product change requests and finished inventory planning for all Hughes products. Assisting Lesch are **J. Z. Brewer,** manager, product coordination; **A. G. Davis,** manager, distribution inventory planning, and **W. A. Kistler, Jr.,** product manager, rock bits, the position formerly held by Lesch.

John W. Jennings, formerly application engineer, Houston, for **Clark Bros. Co.,** has been promoted to sales representative-small engines for the same district; **John L. Spencer,** appointed application engineer, Houston, will report to **J. Y. Allen,** district manager, and **James O. Campbell,** formerly application engineer, Turbo Marketing Department, Olean, N.Y., has transferred to the Los Angeles District office, as application engineer.

Will Mitchell, Jr., has been appointed as acting director-Research Division, **Allis-Chalmers Manufacturing Company.** He was previously associate research director of the company's Research Division. He succeeds the deceased **Dr. H. K. Ihrig.**

J. C. Young has been transferred from London, England, to Rome, Italy, by **Ideco Division of Dresser Industries, Inc.,** as manager, **Ideco Division of Dresser A. G. W. L. (Bill) Farrow** has been appointed manager of **Ideco Division, Dresser (Great Britain), Ltd.,** with offices in London, and **Shannon L. Matheny, Jr.,** has been promoted to the post of New York export manager.

R. J. Bevington and **R. S. Allison** have been appointed store managers at Freer, Texas, and Lake Charles, La., respectively, for **Jones & Laughlin Supply Division.** Bevington was a salesman at McAllen, Texas, and Allison was previously a salesman at Beaumont, Texas.

Earl F. Mayer recently has been appointed controller of the **Axelson Division of U.S. Industries, Inc.,** Los Angeles.

Herbert L. Willke has been appointed director of engineering for **The National Supply Company.** His appointment followed the retirement of **Joseph R. Mahan** as director of research and engineering.

Robert F. (Mike) Meiklejohn has been re-assigned to **BJ Service, Inc.,** as manager of the Wire Line Division. For the past three years Meiklejohn has been on a special assignment with the Borg-Warner development teams in the fields.

R. L. Hanes has been appointed general manager of Tubular Sales of **The Colorado Fuel and Iron Corporation.** Previously he had served as district sales manager at Houston and Fort Worth; manager of Warehouse Sales at the general offices at Denver, and as manager of Wire and Rolled Product Sales. Hanes has been with CF&I for 31 years. He has been in sales 25 years, and most recently has been assistant to the vice president of sales.

R. L. Hanes

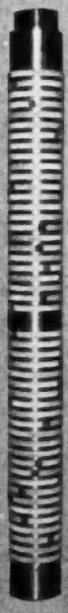
T. Webster Matchett, has been appointed general manager of the Pershing Road plant of **Link-Belt Company** in Chicago. **George Ramsden** succeeds Matchett at the Caldwell plant in Chicago. **Gerald A. Stone** succeeds Ramsden at Minneapolis.

Alvin (Dutch) Zwerneman, pioneer petroleum equipment executive, has severed all connections with the **Atlas-Bradford Company,** holding organization for **Atlas Pipe, Inc., Bradford Supply Company, Hardy-Griffin Engineering Corporation** and **Universal Inspection & Testing Company.**

M. J. Helmich has been appointed chief engineer of the Development Division of **The Cooper-Bessemer Corporation,** succeeding the retired **W. R. Crooks, G. A. Dorton** replaces Helmich as assistant chief development engineer. Crooks will continue his association with the corporation in the capacity of development consultant, reporting diectly to **R. L. Boyer,** vice president and director of engineering.

Let R-u-b-b-e-r Take The Wear
in your sucker rod pumps

IT COSTS YOU LESS THAT WAY



● MARTIN RUBBER & DUCK RINGS give excellent life in dirty abrasive fluids . . . high or low gravity . . . much or little water . . . shallow or deep wells. They last for years in the easier pumping wells. Replacement rings cost comparatively little.

● MARTIN PLUNGER BODIES, precision grooved, drilled and threaded (no underneath fluid passage), usually last for years. Tube or barrel costs are often cut in half.

● The replaceable SYNTHETIC RUBBER GUIDES in MARTIN CAGES last longer than any metal, and the cushioning of the ball increases your ball & seat life. Results are often truly amazing. (Patent No. 2,591,174)

Write for our new 1960 catalog or see it in the new Composite (24th Edition). All products sold thru supply companies.

JOHN N. MARTIN
Manufacturer
9 W. BRADY STREET • TULSA, OKLAHOMA

lower your cost of possession

2 Nickel Alloy Steels provide

A simple plan to save money by Steel Standardization

How many types of steel do you normally use?

Chances are you should examine your needs for alloy steel to see how many can be satisfied with just two types, 4340 through-hardening and 4620 carburizing.

You are likely to find that most of your engineering requirements can be met with confidence when you *standardize* on these two general-purpose steels.

You simplify inventory and materials-handling. You save money in purchasing and production, too.

• 4340 stands alone among medium-carbon steels in its ability to provide maximum strength, ductility, toughness and resistance to fatigue in parts of medium to heavy section.

• 4620 is a carburizing type that has consistently proved itself the ideal steel for a wide variety of carburized parts. 4620 is easy to carburize and has a minimum tendency toward distortion in heat treatment.

Available From Steel Service Centers

Both 4340 and 4620 are stocked by Steel Service Centers from coast to coast, ready for off-the-shelf delivery in a variety of sizes.

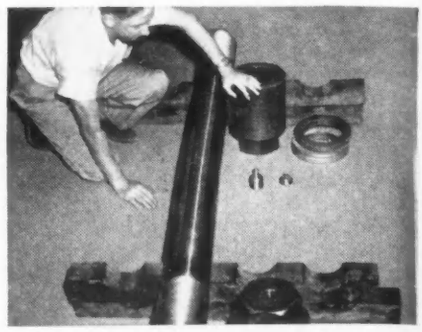
When you have carried your standardization plan as far as you can and you still have specialized needs to fill, the right nickel steels are available to give you extra performance or even lower costs.

For a buyer's guide to Steel Service Centers that stock 4340 and 4620, and other nickel-containing grades, simply write Inco.

INCO TRADE MARK

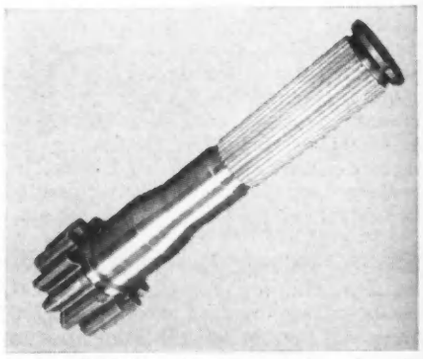
THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

STEEL SERVICE CENTER INSTITUTE

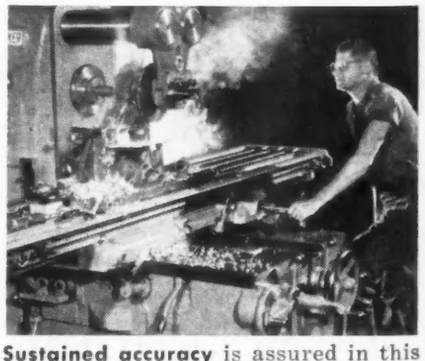


Holding the Shippingport nuclear reactor's top head to its shell section is a job performed by 42 studs of AISI 4340. This through-hardening nickel steel provides essential strength and toughness.

Power-packed tractor features unique drive mechanism composed of regular gear transmission, clutch and torque converter with lock-up, utilizes nickel alloy steels in more than 25 components.



Swing shaft for giant power shovel made from 4340 nickel alloy steel for strength and toughness to take shock-loading in stride. This 9"-diameter, 36"-long shaft of 4340 nickel alloy steel transmits tremendous torque to a giant ring gear.



Sustained accuracy is assured in this heavy-duty milling machine by spindle and gear components of AISI 4340 and 4620 nickel alloy steels. They provide needed strength and wear resistance.

Suppliers' notes

J. T. Douglas has been appointed sales manager of **Schlumberger Well Surveying Corporation's** Louisiana Gulf Coast Division, headquartered in Lafayette. Other changes in the Louisiana-Mississippi field staff include the transfer of **H. H. Ham,** location manager at Laurel, Miss., to Houma, La., as senior sales engineer. **J. D. Cunningham** succeeds Ham as Laurel location manager. **C. B. Dennis** will fill the position of location manager at Donaldsonville, La., vacated by Cunningham. He had been sales engineer in the Southern Louisiana Division.

J. T. Douglas

Pat Childs has been appointed sales manager of the **Harold Brown Company** of Houston. Childs was manager of the **Harold Brown Company** of California before his recent appointment.

Ernest E. Baccus has joined the **Houston Oil Field Material Company, Inc.,** as a sales and service representative in East Texas, with headquarters in Tyler.

Norris B. Green has joined **Republic Rubber Division, Lee Rubber & Tire Corporation** as Southwest district manager.

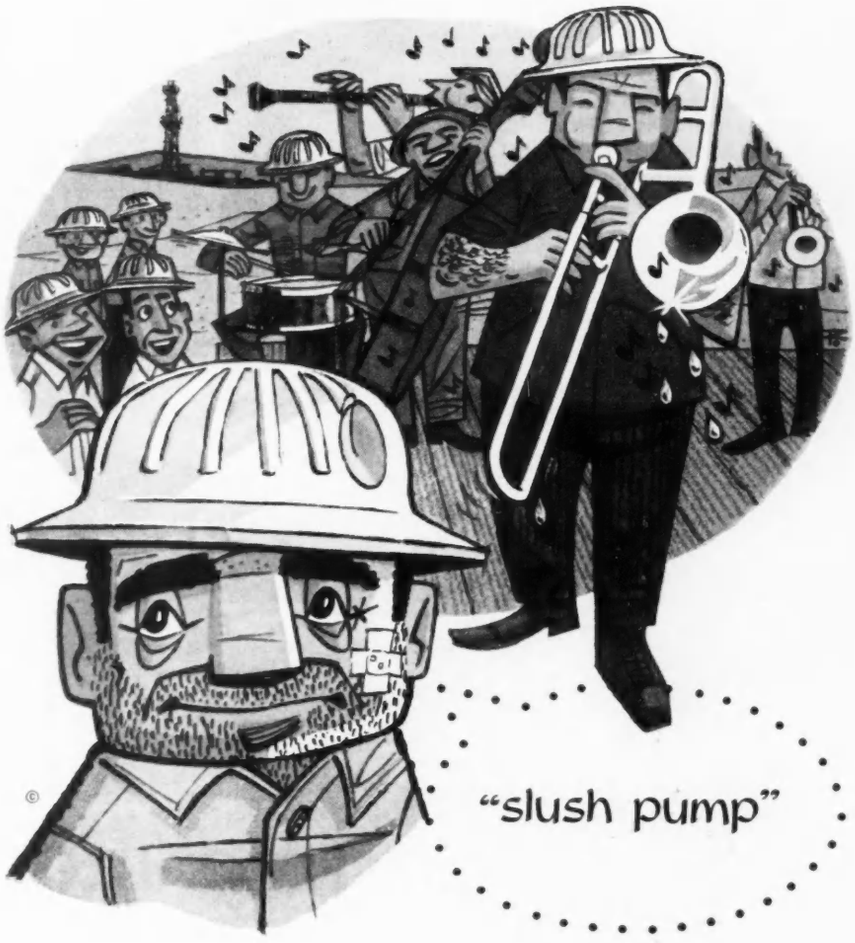
Tueniss (Tony) Vanderhoef has been appointed as an additional service representative in the Rocky Mountain District by **Technical Oil Tool Corporation.** Vanderhoef will be based at Casper, Wyo., and will operate under the supervision of **Eldon Snyder,** district manager in Casper for TETCO.

T. Vanderhoef

Tommy L. Nichols, McEvoy Company, has been named sales engineer in the Louisiana District with headquarters in Lafayette. Nichols moves to his new assignment from the home offices of the company in Houston. Also, **C. B. Herring** has been appointed sales and service representative in Laurel, Miss., to be in charge of the company's operations in Mississippi, Alabama and Georgia.

T. M. Bailey, formerly store manager at Electra, Texas, for **Jones & Laughlin Supply Division,** has been assigned as salesman at Electra. **J. R. Carson,** previously salesman at Duncan, Okla., has been assigned as salesman at Healdton, Okla., and **D. P. Loyd,** formerly salesman at Snyder, Texas, has been transferred to Witchita Falls, Texas, as salesman.

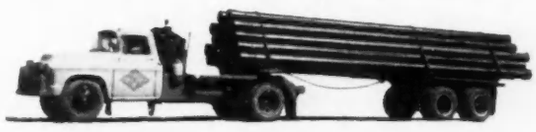
Congrats and $25 to R. STROHMEYER, J. M. Huber Corp., Borger, Texas



When it comes to blowing our own horn . . . We believe it is done best by delivering pipe of quality, stamina and dependability. Lone Star, the oil country's own steel mill . . . does just that on a round-the-clock basis.

The Lone Star plant embodies the most advanced techniques in making casing, tubing, and line pipe to exacting API specifications.

Neighbor, wherever you are, specify Lone Star and we both get a good deal.



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Lone Star STEEL COMPANY

L S S

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W. Mockingbird Lane at Roper • P. O. Box 12226 • Dallas, Texas
DISTRICT SALES OFFICES
912 Republic National Bank Building, Dallas, Texas
Houston, Texas | Midland, Texas | Tulsa, Oklahoma

Suppliers' notes

Jerry Cahill has been named the new district manager at Tyler, Texas, for **Welex, Inc.,** and **Ray Evans** replaces Cahill at Fort Worth as sales engineer. **R. H. Mallet, Jr.,** has been named the new district manager at Winfield, Kan. **Lyle Dean Stroup** has transferred from Tyler, Tex., to Shreveport, as engineer. **W. F. Nidiffer,** field engineer, from Shawnee, Okla., to Pampa, Texas. **George E. Wright,** from Houston logging operator to Houston Division engineer, and **T. J. Wall** from Winfield District manager to marine assistant district manager at New Orleans.

B. R. Dixon has been advanced to vice president - operations for **Johnston Testers, Inc.,** and elected to the firm's board of directors. In this capacity, Dixon will coordinate all the firm's domestic sales and service operations. Dixon served as Johnston's operations manager prior to his recent promotion.

B. R. Dixon

W. A. Montgomery, field engineer general at Fort Morgan, Colo., for **Schlumberger Well Surveying Corporation,** has been named sales engineer at that location. **W. F. Stephen,** formerly location manager at Kimball, Neb., has been named senior sales engineer. **B. E. Davis,** field engineer general at Pawhuska, Okla., has been transferred to Enid, Okla., to serve as sales engineer. **W. B. Jackson,** sales engineer, has been moved from Liberty, Texas, to the Texas Gulf Coast Division, headquartering in Houston.

E. G. Holm, Jr., was elected to the board of directors of **Tuboscope Company** at the company's annual stockholders meeting.

Walter S. Bowers, has joined **The Foxboro Company** and will specialize in sales promotion and instrument engineering.

Ray L. Sewell has been appointed as Gulf Coast representative for **Hunt Tool Company.** Besides representing the Hunt cutting and fishing tool service division in Louisiana and Mississippi, Sewell will also direct his activities toward the sale and rental of stabilizers, combination bits, Hunt-Cullum Hardbanding and other manufactured products.

Ray L. Sewell

William R. Palmer has been appointed manager of the **Link-Belt Company** Dallas District and factory branch store. He succeeds **Gerald A. Stone,** who has become general manager of the company's Northwestern Division in Minneapolis, Minn. **J. William Boyce,** former district sales engineer of the Chicago District office, succeeds Palmer as district manager at Shreveport.

J. W. Northcutt has been named assistant vice president and manager of the **Petroleum & Industrial Meter Division, Rockwell Manufacturing Company.** He was formerly an assistant vice president in Rockwell's Municipal Utility Division.

F. E. Cornwall

F. E. Cornwall has been elected president of **Macco Corporation.** He succeeds **John MacLeod,** newly elected chairman of the board of directors, to the presidency. Cornwall joined Macco in the 1930s. He became assistant general manager in 1943, and in 1945 was elected vice president and general manager of the corporation.

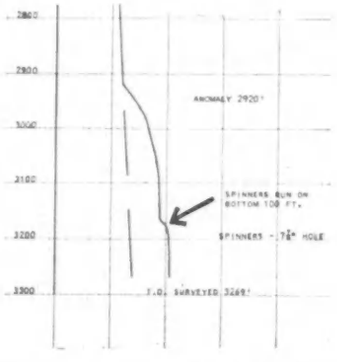
Wilkens-Anderson Named Unicam Distributors

Wilkens-Anderson Company, according to a recent announcement by the company President H. J. Wilkens, have

The New PROVEN WAY to get the...

BEST CEMENT JOB

SPIN-O-LIZER CEMENT SPINNERS



Temperature Logs prove that Spin-O-Lizer gives you the most thorough and uniform cement job, as indicated by actual log above. Spin-O-Lizers were run on the bottom 100' of 2⅞" casing in 7⅞" hole. A constant 4° rise was recorded.

★ ELIMINATES CHANNELING
★ REDUCES CONTAMINATION
★ SPACES MULTIPLE CASING STRINGS
★ CENTERS CASING
★ ACTS AS STOP COLLAR
★ MADE OF TENZALOY

Contact your favorite supply store, Clark Oil Tools or their representatives for SPIN-O-LIZERS, Clark Scratchers, Centralizers, and Stop Collars

CLARK OIL TOOLS

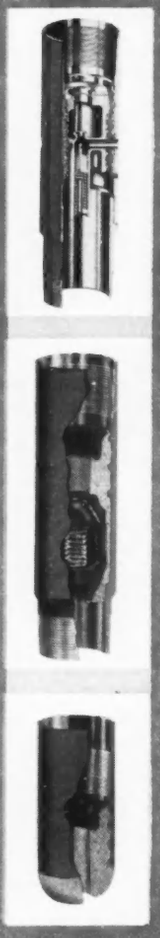
PH. 767-2440. WICHITA FALLS, TEXAS. P. O. BOX 238

REPRESENTATIVES

Roy Manning—Wichita Falls, Texas
Bill Whitaker—Throckmorton, Texas
Dave Crancer—Dallas, Texas
Kenneth Clark—Alice, Texas
Owen Marsh—Tulsa, Okla.
Ben Bolding—Gymon, Okla.
B & R Service Co.—Farmington, N. M.
John Raymond—Hutchinson, Kan.

ith Halliburton

FLOATING AND GUIDING EQUIPMENT



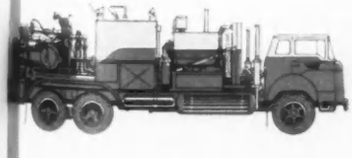
HERE'S A GOOD EXAMPLE: In completing a deep well in West Texas, one operator used three Halliburton tools on the string of casing to save time and money. He chose:

1. **THE SELF-FILL DIFFERENTIAL COLLAR**– to automatically fill the casing above the top float collar to maintain a balanced fluid head inside and outside the pipe . . . helping to protect the casing from collapsing.
2. **THE SUPER SEAL FLOAT COLLAR**– to provide a fluid barrier inside the string as it was run . . . taking part of the strain off of the derrick by partially floating the string to bottom.
3. **THE HALLIBURTON GUIDE SHOE** – to help direct the string away from ledges and other obstructions such as hard shoulders and crooked holes to minimize side-wall caving while running casing to bottom.

HERE'S WHERE SELECTION COMES IN: For wells where a medium range of differential pressure will be encountered, the operator could elect to use Halliburton's new INSERT SELF FILL-UP FLOAT VALVE instead of the Self-Fill Differential Collar as both perform similar functions. He could have substituted a less expensive INSERT FLOAT VALVE for the heavier-duty Super Seal Float Collar. In place of the Regular Guide Shoe, he might have used Halliburton's TURBO-JET GUIDE SHOE which is equipped with a fluid actuated rotor to provide high turbulence of cement slurry around the shoe – helping to keep the well bore clean and provide a better distribution of cement around the shoe joint. The Turbo-Jet Shoe is also available with a built-in back pressure float valve.

THE POINT IS... Halliburton has developed the tools that will best fit your specific well completion requirements. These described above are just a few of Halliburton's Floating and Guiding Casing tools. Your nearby Halliburton man can show you all the rest – and explain their many uses.

CEMENTING SERVICES



Halliburton

COMPANY • DUNCAN, OKLAHOMA

Suppliers' notes

been appointed exclusive midwest distributors for Unicam Instruments, Ltd., the English manufacturers of spectrophotometers for the ultra-violet, visible and infra-red regions, as well as flame emission.

Western Machinery Named By Koehring Company

Western Machinery Company, Inc., has been named as distributor in the Texas Panhandle area by the Koehring and Parsons Divisions of Koehring Company.

The new distributor will handle the complete Koehring line of excavators, cranes, paving and finishing equipment, hauling units and the Parsons line of Trenchliners, both wheel and ladder type.

Western Machinery Company, Inc., is located in Abilene, Texas, with a branch office at Odessa.

Udell, Inc., Purchases Lane Wells Packer Line

Udell, Inc., President H. U. Garrett has announced the completion of a $695,000 venture in which his company acquired the entire Lane Wells packer line. According to the announcement, this new expansion of the Udell firm would provide employment for 30 persons and would mean approximately $100,000 a year to local vendors and suppliers.

Lane Wells will continue to market the Udell packers under its name. Udell will manufacture packers for Lane Wells and will also market this line through selected distributors and supply stores.

Smith Tool Division of Smith Industries, Inc.

Smith Tool Company has recently been made a division of the newly created Smith Industries International, Inc. A management policy of diversification and expansion led to the formation of Smith Industries, with Donald E. Graham as president and Robert L. Flynne as vice president-finance. H. C. Smith, founder of the original H. C. Smith Tool Co., is chairman of the board.

D. E. Graham

As a division of Smith Industries, Smith Tool Co. is now headed by Kenneth H. Swart, president, and Arthur S. Marshall, vice president-sales. Other divisions of Smith Industries include Smith Dynamics; Bufnel Co.; Smith Forge Co., and Barrenas de Mexico.

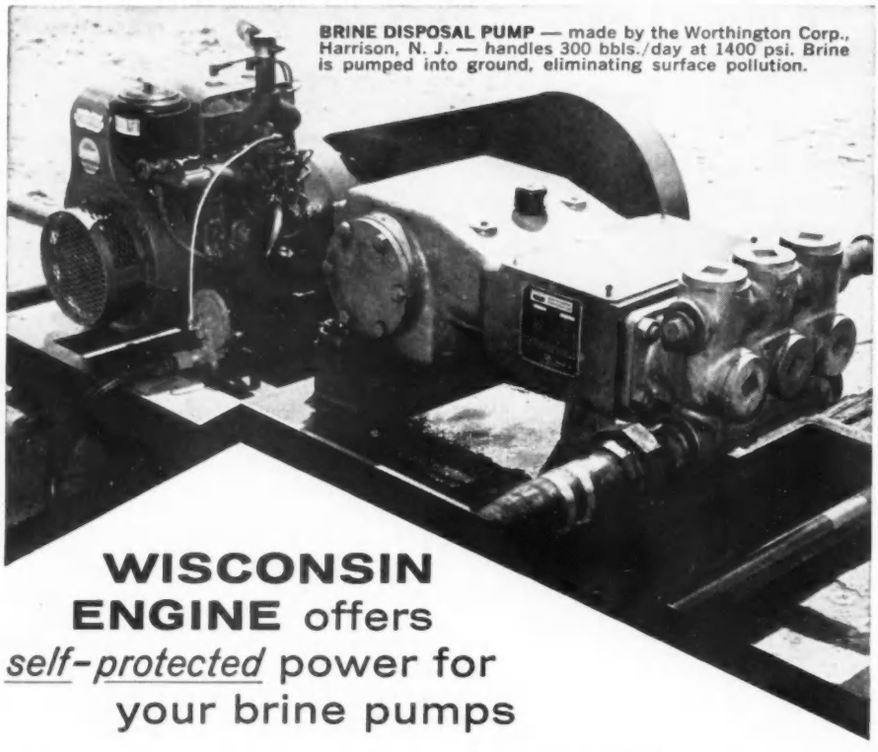
The organizational mission of the various divisions illustrates the wide diversification being achieved by Smith Industries. Barrenas de Mexico, located in Mexico City, is a division organized to serve the petroleum industry of Latin America with Smith jet rock bits. Smith Forge Co., in addition to performing forge service for the other divisions of the organization, will also make its service available to outside industries. The Bufnel Co. of Santa Fe Springs, Calif., manufactures steel gratings, metal floors and allied products. Smith Dynamics, headed by William A. Wilson, president, occupies the former Web Wilson facilities in Compton, Calif., and specializes in the manufacture of electro-mechanical equipment and devices used by the aircraft and missile industries for both airborne and ground-support applications.

It is anticipated that Bufnel Co. may be moved at some time in the future from Santa Fe Springs to the central Smith Industries complex in southern Los Angeles.

Airdrill International Is New Colorado Firm

Airdrill International, Inc., has been formed in Denver to specialize in feasbility studies and program planning for air/gas drilling operations outside of the U.S.

Robert W. Sneed, president of the consulting firm, is also a vice president of the parent company, Well Completions, Inc., Denver based air/gas drilling engineers. According to Sneed, a rapid spurt in the technology of air/gas drilling—bring new tools, chemicals and techniques—has changed the air/gas drilling picture in the last 24 months.



BRINE DISPOSAL PUMP — made by the Worthington Corp., Harrison, N. J. — handles 300 bbls./day at 1400 psi. Brine is pumped into ground, eliminating surface pollution.

WISCONSIN ENGINE offers *self-protected* power for your brine pumps

Start it, and you can just about forget the above Wisconsin-powered Worthington brine pump. The two-cylinder Model THPD Wisconsin Engine that powers it is specially built for rugged oil field use. It has an extra 80-lb. flywheel at the take-off end which triples the momentum factor (WR^2). This, with its built-in load-lugging power and an oversize industrial clutch, assures trouble-free pumping under terrific shock and constantly varying load conditions — day in, day out.

Self-cleaning tapered roller bearings on both ends of the shaft make bearing failure almost unheard of. Stellite valves and inserts and positive rotators boost engine performance and give *up to 5 times longer valve life.*

The THPD is self-protected against burn-out through neglect. A high-temperature safety switch shuts the engine off automatically at a pre-set danger point. A low-oil cut-out switch shuts the engine off when the crankcase oil runs low.

Put your untended oil field utility units on a paying care-free basis — power them with Wisconsin Engines. Electric starting available for all models, 3 to 56 hp. Write for free copy of Bulletin S-251.

WISCONSIN
MOTOR CORPORATION
Milwaukee 46, Wis.

MOST H.P. HOURS

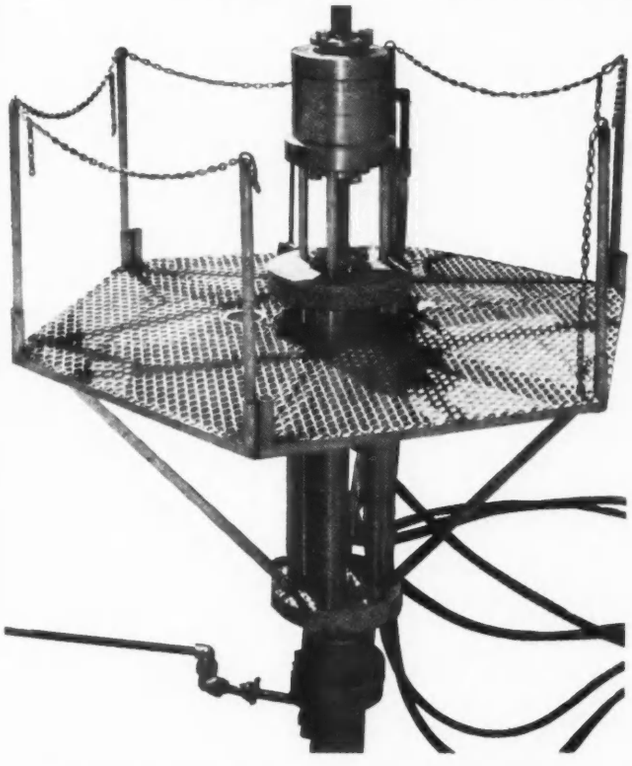
WRITE TO HARLEY SALES CO.
619 SOUTH MAIN STREET • TULSA OKLAHOMA
3420 MC KINNEY AVENUE • HOUSTON, TEXAS
805 SOUTH MAIN STREET • WICHITA, KANSAS
Oil Field Distributors for Wisconsin Engines and all types of Utility Units

World's Largest Builders of Heavy-Duty Air-Cooled Engines

J-242

INTRODUCING "Snubby"

BROWN HYDRAULIC SNUBBER AND WORKOVER UNIT



IDEAL FOR CONCENTRIC STRING WORKOVERS

Some of the many operations you can perform under full pressure control with this versatile, money-saving unit:

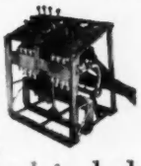
1. Plugged pipe may be pulled, repaired and re-run.
2. Outside or inside cuts may be made to remove sections of pipe which have developed holes or become stuck.
3. You may wash over stuck pipe.
4. An overshot may be run to pick up pipe which has been dropped.
5. A packer may be run or pulled under pressure.
6. A packer or retainer may be pulled safely while it swabs the hole.
7. Pressure controls may be installed on a drilling well when extra high pressures are anticipated.
8. Sand bridges may be drilled out under pressure.
9. Parted tubing may be repaired under pressure.

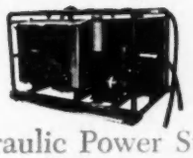
FIRST IN THE FIELD AND ALREADY PROVEN

Running and pulling pipe under pressure is now a safer, faster, less tedious and cumbersome operation – thanks to the Brown Hydraulic Snubber. Rig and draw works are not needed – wells need not be killed – potential damage to pay zones is eliminated since weighted fluids are not needed – saves time and money with increased safety.

Everything is hydraulic – lifting and lowering, slip actuation and control. Two sets of opposed, double acting slips – one traveling, the other stationary – are hydraulically operated to securely grip the pipe for snubbing in or out. Controls are interlocked so that one set of slips is always engaged.

A remote hydraulic power source, control panel, and all auxiliary equipment is furnished – including a gin pole tall enough to handle a joint of tubing if necessary. Thus workover jobs can be done without moving in a complete rig.





Control Panel includes weight indicator and may be spotted at any convenient place.

Hydraulic Power Supply may be located 100' from well for greater safety.

BROWN
OIL TOOLS, INC.

8490 KATY ROAD P. O. BOX 19236,
HOUSTON 24, TEXAS

WORLD OIL'S Trading Post CLASSIFIED ADVERTISING

RATES: Regular Classified (undisplayed) set in this size type: 20 cents per word. Minimum charge $4. Blind box address in our care counts six words. Replies forwarded without charge. **Display Classified ads,** set in suitably larger type with ruled border, $13.50 per column inch. Ten percent discount for two or more insertions of same copy in consecutive issues. **All classified ads payable in advance.** Send copy and checks to: Trading Post Classified Section, World Oil, P. O. Box 2608, Houston, Texas.

FOR SALE

■ Failing 1500 long mast kelly. Franks KC 5 x 6 pump. Others complete. Drill pipe, core barrels. Hexigon kellys. Fred Butler, Box 481, Pueblo, Colo.

■ CORE DRILL OPERATORS. We purchased Government Surplus core drilling equipment. Will offer at big money-saving prices. Contact Pressey & Son, Pueblo, Colo.

■ Approximately 5,000 acre gas lease. Eastern Kentucky. Five completed shut-in wells, Conniferous pay. Reserves in excess nine billion c.f. Complete well logs and gas analysis available. Partially depleted gas field included in lease—ideal for gas storage. Wire or write Box 219-W, WORLD OIL, Houston, Texas.

■ Bethlehem Crown Block, 525 Tons, 7 sheave, 55" diameter, like new. $7,500.00 FOB Morgan City, Louisiana. Transcontinental Import Export Corp., 506 Pan American Bldg., New Orleans, Louisiana. JAckson 2-8406.

MUD PUMP
FOR SALE OR TRADE

7¾" by 14" Gardner Denver Mud Pump, completely gone through, will trade for casing or tubing.

Contact Luke Wise
COMMUNITY GAS & OIL CO.
Billings, Montana

NOTICES, SERVICES

Oil Industry Cartooning

Oil Industry Gag & Spot cartoons for house organs, magazines, and papers...

Write...

Alvin H. Bloodworth
1838 South Euclid, Ontario, California

Manuscripts Wanted

Have you written a book you would like to have published? Do you have an idea or an outline that you would like to talk over with a publisher? Gulf Publishing Company, publishers of World Oil, Petroleum Refiner and Pipe Line Industry magazines, and numerous technical books, is actively seeking trade and technical manuscripts for publication by its rapidly expanding Book Division. For further information write to Manager, Book Publishing, Gulf Publishing Company, P. O. Box 2608, Houston 1, Texas.

SITUATIONS WANTED

■ Capital needed to drill offset production in Ohio and W. Va. Oil bringing 4.17 per BBL. Gas .25¢ per thousand. David W. Law, 716 Union Trust Bldg., Parkersburg, W. Va. Phone: HU 5-6446.

LEASES, DRILLING, ACREAGE, ETC.

■ Have thousands of acres in Ohio and W. Va. close to Big Play, to farm out. We have a very competent Land Department. Will take leases on your lease form. David W. Law, 716 Union Trust Building, Parkersburg, W. Va. Phone: HU 5-6446.

■ U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington, D. C. The oil and gas lease offering of four parcels of land, totalling approximately 8,605 acres within the Barksdale Air Force Base, Bossier Parish, Louisiana, scheduled for 1:00 P.M., E.S.T., November 16, 1960 at the Bureau of Land Management, Department of the Interior, Washington, D. C. has been cancelled because information received subsequent to the announcement of the lease offering requires modification of the plat to be included in any leases which may issue. Any bids submitted for the cancelled lease offering will be returned unopened. Notice is given that the aforesaid 8,605 acres of land are being reoffered for oil and gas leasing through competitive bidding in four separate parcels to the qualified bidder of the highest cash amount per acre for each parcel at 1:00 P.M., E.S.T., December 14, 1960 when bids will be opened. Additional information concerning this lease offering, how and where to submit bids, copies of the lease agreement and bid forms may be obtained from the Director, Bureau of Land Management, Department of the Interior, Washington, D. C.; Bureau of Land Management Office, 1001-A Maritime Building, 203 Carondelet Street, New Orleans, Louisiana; Branch of Oil and Gas Operations, Geological Survey, General Services Administration Building, Washington, D. C.; Oil and Gas Supervisor, Midcontinent Region, Geological Survey, 608 Midstates Building, 6 E. 5th Street, Tulsa, Oklahoma; District Engineer, Geological Survey, 201 Barnes Building, 323 Market Street, Shreveport, Louisiana. Edward Woozley, Director.

ROYALTY BUYERS

We have a spread of income producing Gas-Distillate royalties under new, deep, dual and triple completed wells on the Gulf Coast.

Ogden Oil Company
P. O. Box 409, Taylor, Texas
Phone EL-23352

EQUIPMENT FOR SALE

■ Walker-Neer C-34 spudder with 145 GKU Waukesha engine. 6000' 9/16" sand line, plastic covered hemp. 5800' ¾" drill line, plastic covered hemp. Complete set of tools; tool house, skid mounted. All equipment in A1 condition. Contact Bradford Supply Company, Wichita Falls, Texas. Phone 723-2761.

HELP WANTED

ENGINEERS

Sales Engineer Wanted to take charge of sales and service. Commission Base. Oil Industry Experience desirable.

WRITE P. O. BOX 49
ALBION, ILLINOIS

New Books and Maps

GASOLINE PRICING IN OHIO, Division of Research, Harvard Business School, Boston 63, Mass., Edmund P. Learned and Catherine C. Ellsworth, $9.

This book is primarily a study of price leadership and price competition at the retail level in two specific regions of Ohio comprising the Akron and Toledo Divisions of The Standard Oil Company (Ohio). A complete disclosure of the price policies followed by The Standard Oil Company (Ohio) over the past 20 years, of the changes made in such policies, and of the reasons therefor is presented.

TERTIARY STRATIGRAPHIC PAPERS, SOUTHWESTERN WASHINGTON, Washington Department of Conservation, Division of Mines and Geology, General Administration Building, Olympia, Wash., P. D. Snavely, Jr., Weldon W. Rau, Linn Hoover, Jr., and Albert E. Roberts, 25 cents.

Known as Reprint No. 3, contains three reports reprinted from The Bulletin of the American Association of Petroleum Geologists. Their titles are: "McIntosh formations, Centralia-Chehalis coal district, Washington," by P. D. Snavely, Jr., Weldon W. Rau, Linn Hoover, Jr., and Albert E. Roberts; "Lye formation (redefinition), northern Olympia Peninsula, Washington," by R. D. Brown, Jr., P. D. Snavely, Jr., and H. D. Gower; and "Twin River formation (redefinition), northern Olympia Peninsula, Washington," by R. D. Brown, Jr., and H. D. Gower.

Reprint No. 5 contains two reports from the July 1959, issue of WORLD OIL.

TATLOCK'S FOUR CORNERS-ROCKY MOUNTAIN PETROLEUM DIRECTORY, Bob Tatlock, Majestic Building, Denver.

The outstanding feature of this book is its cross-indexing; with the names of the key personnel of the listed companies; landmen, geologists, purchasing agents, drilling superintendents, toolpushers, production agents, engineers, office managers, foremen, et al, included in a single alphabetical list.

BULLETIN 87, GROUND WATER OF CANADIAN COUNTY, OKLAHOMA, Oklahoma Geological Survey, Joe L. Mogg, Stuart L. Schoff and E. W. Reed. Bound $2.75; Paper $2.00.

This report gives results of an investigation in Canadian County, Oklahoma, of the ground-water resources of the bottom lands along the North Canadian River and of a reconnaissance of the ground water of the rest of the county.

Report also includes figures, maps and tables.

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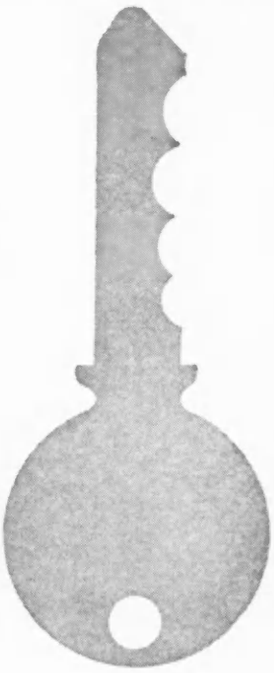
OIL LOANS



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NATIONAL BANK OF TULSA

THE OIL BANK OF AMERICA

OFFERING COMPLETE BANKING AND TRUST SERVICES

From the ROYAL FAMILY of

KING SWIVELS

NEW

30, 40 & 50 KG SWIVELS

All with 3" watercourse

NEW

packing box arrangement eliminates necessity of removing gooseneck and bearing housing to change packing, thus eliminating thread-galling.

SUPERIOR PERFORMANCE

at 100 rpm to 6,200 feet with 2⅞", 3,800 feet with 4½" drill pipe. . . . Perfect for drilling relatively shallow oil wells, the deepest of water wells, workover rigs and slim hole drilling!

NEW!

- Wash-pipe packing box arrangement — interchangeable, all 3 sizes.
- Oversize water course (ideal for conventional and reverse circulation)
- Zerk Fitting in stuffing box for simplicity in lubrication of

KING OIL TOOLS

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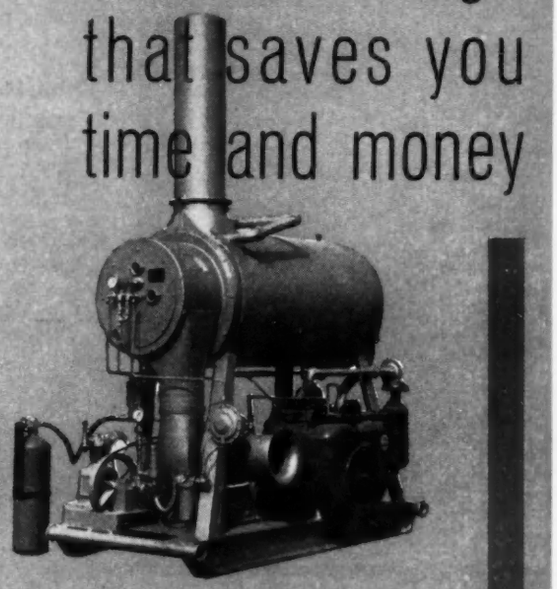
Export: R. S. STOKVIS & SONS
17 Battery Place
New York 4, N. Y.

3 sizes **Texheater**

a common sense heater design that saves you time and money



AND STILL OUTPERFORMS ANY HEATER IN ITS CLASS

A lot of common sense went into the engineering of Texsteam's versatile Texheaters. The result is an economical, fast, safe heater (in three sizes) that can be used for virtually any application where heat is needed for a fluid.

ECONOMICAL, because these Texheaters drastically cut fuel bills by operating from treated crudes in most cases.

FAST, because field tests prove that they heat two to three times faster than any other heaters of comparable size.

SAFE, because Texheaters come equipped with a complete range of automatic safety controls including automatic damper, automatic motor shutdown, automatic temperature control, automatic modulated fire and constant spark ignition, and are equipped with a CO_2 quenching ring for instant burner extinguishment.

Texheaters will burn natural gas, propane, kerosene or diesel oil as well as treated crude.

Available in three sizes from 1,000,000 BTU/hour to 3,500,000 BTU/hour output.

Write for Catalogue No. 25M-1

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TEXSTEAM CORP.

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Hold your next get-together in New Orleans!

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The JUNG
NEW ORLEANS, LA.

1100 guest rooms, 10 handsome meeting rooms. Tulane Room seats 1550 for meetings, 1000 for banquets. Charcoal Room. Contact Sales Dept.

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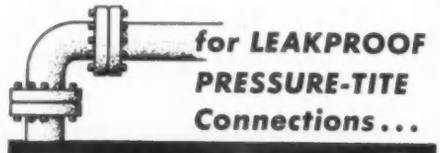

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TiteSeal®
SEALING COMPOUNDS

Heat and vibration-proof, non-solvent, will not shrink, crack or crumble. Makes all assemblies leak-proof and pressure-tight. Prevents rust, corrosion and joint seizure.

7 BASIC BLENDS

LIQUID WRENCH

LOOSENS RUSTED BOLTS

A powerful blend of fast-acting solvents that literally "melt the rust away"—safe on all metals and alloys.

RADIATOR SPECIALTY CO.
CHARLOTTE, N. C.

SQUEAKS

From the Bull Wheel

It Pays to Advertise

No statistics are available, but we understand the accident rate went down at a New Jersey intersection after a new sign was posted: CROSS ROAD—BETTER HUMOR IT.

When He's Right—

"Wise men are always in doubt. Only idiots are sure of their case."

"Are you sure about that?"

"Yes, absolutely!!"

She-Sick

She: "You remind me of the ocean."

He: "Wild, romantic and restless?"

She: "No. You make me sick!"

It's a Fact

The more you listen to political speeches, the more you realize that ours is indeed, the "Land of Promise."

Today's Children

Voice from woodshed: "Junior, put down that stick!"

What's the Score?—Who Cares?

Atheist: A football fan who doesn't care who wins the Notre Dame-Southern Methodist game!

Must Be A Texan

During a heavy blizzard the foreman of a railroad crew, head bent against the below-zero gale, walked up to a halted locomotive on the main tracks. Seeing only one man beside the engine he yelled, "Hey, George, where's your fireman?"

The engineer turned, hesitated and then bellowed, "Up in the cab. Got knocked down by a piece of flying ice."

"Flying ice?" echoed the foreman.

"Yeah," shouted the engineer, "He tried to spit against the wind!"

Doesn't Have The Spirit

Woman, watching football game in pouring down rain, said to her husband: "This is probably another one of my stupid questions. Why don't we go home?"

Nope, Try Again Doc.

The doctor looked into the patient's eye, and after careful study said, "I can see that you are suffering from sleeping sickness, gastritis, appendicitis and diabetes."

"Now,'" replied the patient, "Try the other eye, Doc—that one is glass."

A Hobby Lover

A tipsy commuter followed a New Yorker into the subway.

About a half-hour later, he emerged

WORLD OIL

miles away to meet a friend.

"Where ya been?" he asked. "I got tired of waiting."

"Down in some guy's cellar," he answered. "And boy, has he got a set of trains!"

Ain't It the Truth

Madame had just had her hair cut and remarked to her husband: "Now I don't look like a little old lady any more."

"No," replied her husband, "Now you look like a little old man."

The Books They're Writing

Did you year about the Pullman porter who has just finished his first book. It's about Berth Control.

And Being of Sound Mind

The will of the wealthy, eccentric man was being read and the relatives all listened expectantly. Finally, the lawyer said: "And to my nephew, Charlie Jones, whom I promised to remember—'Hi, there, Charlie'!"

"Putter" There Pal

Two golf opponents reached the eighteenth green even up. One had only to sink a tricky 10 foot putt to win. He lined up the putt, pulled back for the stroke when a sudden noise stayed his hand. A funeral cortege was passing by.

The golfer snapped to attention, whipped off his hat, held it over his heart until the last car disappeared. Then he calmly sank his putt.

"Congratulations," said his opponent grudgingly. "It took iron nerve not to let that funeral procession fluster you into missing your putt."

"It wasn't easy," admitted the victor. "On Saturday, we would have been married 25 years."

Another
of the invisible extras that
insure MORE ON-BOTTOM TIME
with LINK-BELT FR®
roller chain

Optical comparator inspection guarantees

precision of every part

Precision is *rigidly practiced* in every step of Link-Belt's roller chain production. The optical comparator is an example of the specialized equipment used to assure precise manufacturing control of chain parts and tools. It is capable of magnification up to 100 times.

Continuous inspection is just one of the *invisible extras* that insure more on-bottom time with Link-Belt roller chain. Others include precise heat-treat control, prestressing, shot-peening, Fatigue Resistant FR* processing of sidebars.

U. S. Patent No. 2,517,497

NATIONAL'S T-32 RIG incorporates Link-Belt FR roller chain.

Features like these are the reasons why users agree Link-Belt roller chain has greater capacity to withstand the smashing impacts and tortuous stresses met in day-to-day drilling.

For engineering assistance in applying FR roller chain, write Link-Belt Company, Indianapolis 6, Indiana. Ask any leading supply store for our Catalog 2980 containing full information on roller chain and other oil field equipment.

15,552

LINK-BELT COMPANY: Indianapolis 6, Houston 1, Dallas 26, Odessa, Tex., New Orleans 16, Shreveport, La., Los Angeles 22, (Montebello), Scarboro (Toronto 13); Export Office, New York 7. Distributors in All Fields.

LINK-BELT

ROLLER CHAINS AND SPROCKETS

4 Four-on-one Pistons cut replacement costs 30% or more!

FOUR piston rubber sizes fit a single Wilson-Snyder "Four-on-one" piston body. To change piston size, you don't change piston bodies—you just change rubbers.

The body flange is not exposed to wear, because this wear is taken by steel reinforcing rubber support rings which are bonded to the piston rubbers. This means that all wearing parts are replaced with every piston rubber change . . . and you always get the same performance that you would from a completely new piston. The piston body never wears out and you can save up to 40% on piston bodies alone when you use the "Four-on-one."

And here's another money-saving advantage: "Four-on-one" piston rubbers are changed without taking the body off the rod. This simplifies changes . . . saves time . . . and gets your pump back into operation faster!

Put "Four-on-one" Pistons in your slush pumps NOW, and see for yourself how they cut costs. Your oil-field supply store has or can get them for you. Wilson-Snyder Works, Oil Well Supply Division of United States Steel, Braddock, Pennsylvania.

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USS Wilson-Snyder Works
Oil Well Supply Division
United States Steel

IT'S ALL STACKED IN YOUR FAVOR AT McCORMICK

. . . and here's WHY!

McCormick has large steel and aluminum warehouses pinpointed in five Southwest locations to offer fast, reliable and efficient delivery and service.

Latest figures show storage costs around the nation have skyrocketed 22%.

McCormick absorbs the cost for you —labor, housing, insurance, taxes and waste— Costs that YOU PAY WHEN YOU BUILD UP YOUR OWN INVENTORIES.

Yes, it's all stacked in your favor when McCormick is in your steel and aluminum buying picture.

After all — that's our business!

McCORMICK Steel Company

Steel and Aluminum Service Centers

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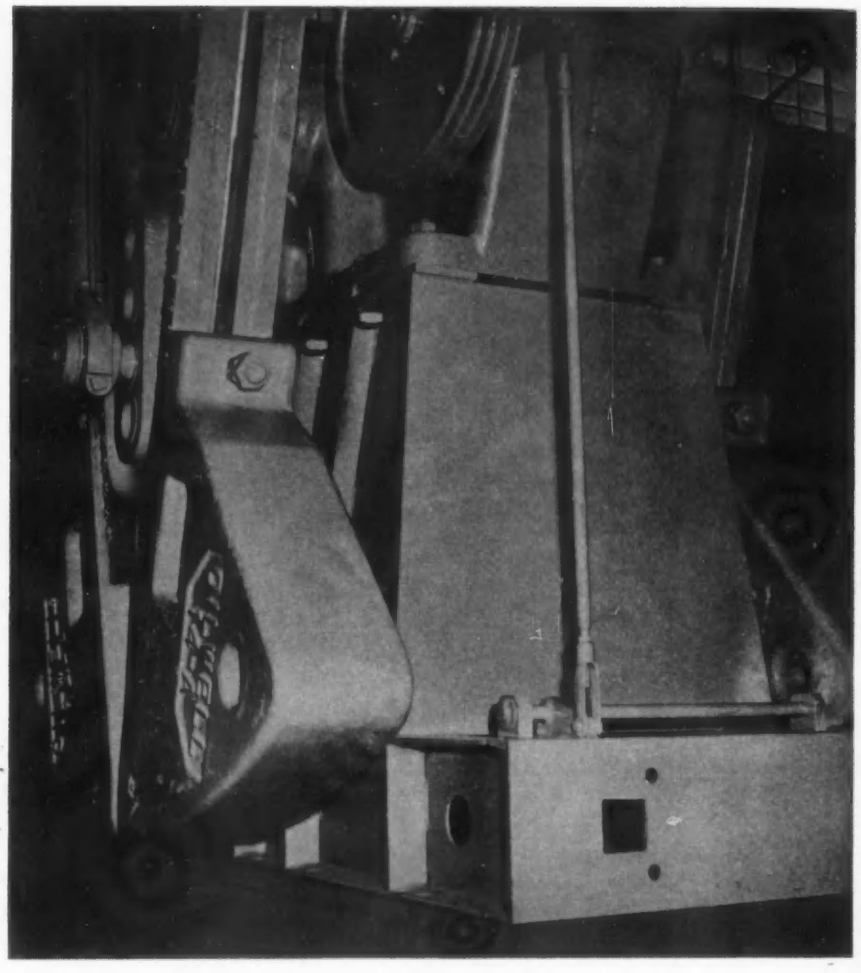

"Oilwell" Century Pumping Units improve counterbalancing with less dead weight

This close-up view of an "Oilwell" Type "G" crank shows how crank weights are placed where they do the most good.

First . . . the weights themselves are thick, stubby, solid shapes . . . so that their greatest mass will be along the outside arc of their rotation.

Then . . . the cranks are made thick and long . . . so that effective counterbalancing forces can be developed from less dead weight.

In operation . . . these improvements increase the precision with which counterbalancing is achieved, by providing a longer weight-adjustment range on the calibrated crank. In addition, lighter crank weights lower the load and reduce normal wear on gear-box bearings.

This improved arrangement also permits the use of longer wrist pins, equipped for hydraulic assisted removal, so that stroke lengths can be adjusted easily and safely. Longer cranks provide an additional wrist-pin hole.

Weight movement on the calibrated crank is completely controlled by jack screws . . . and one man, working on the ground, can quickly and easily (1) unlock, (2) "jack" the weights in or out, and (3) relock at the desired position, while standing outside the line of travel.

For additional information on other advanced and equally desirable features of Century Pumping Units, visit an "Oilwell" store, talk to our representative in your area, or write for a free copy of our descriptive booklet 27-61.

USS and "Oilwell" are registered trademarks

USS Oil Well Supply Division of United States Steel

Executive Offices—Dallas, Texas
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CONSTRUCTION

OIL

MINING

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BENDIX AE INERTIA STARTER

More easily mounted and in more positions • Can be installed in ten minutes without the use of any special tools • Completely self contained . . . no "extras" to buy.

Requires **NO CABLES, NO PUMPS, NO PLUMBING.**

The Bendix* AE Inertia Starter is rugged and dependable under difficult operating and climatic conditions. It is especially suited for use in remote areas where battery maintenance is a problem, or where there is a fire hazard. For complete information, write:

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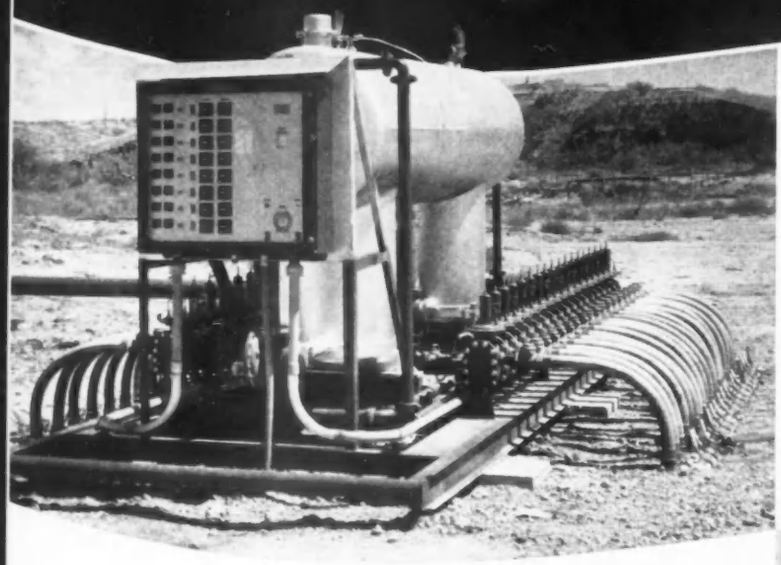
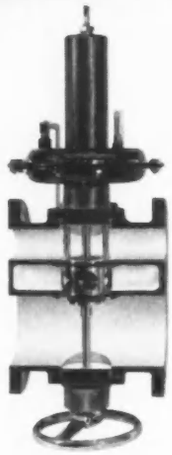
NATIONAL®

Packaged Well Test Unit

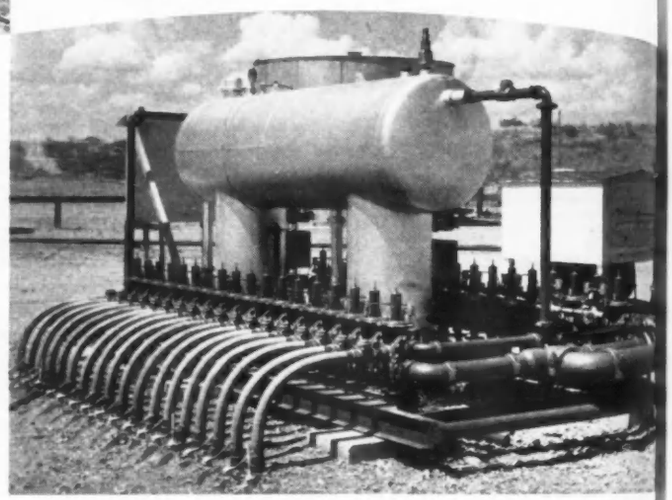
"Tests Better Automatically"





National MANI-FLO® Valves make this compact unit possible. MANI-FLO Valves require no lubrication and no expensive well-headers. When bolted together, MANI-FLOS are their own well-header and test line . . . self-contained . . . — Unique!

PATENT APPLIED FOR



AUTOMATICALLY DIVERTS FLUID STREAMS FROM WELLS, THEN SEPARATES, MEASURES, AND RECORDS QUANTITIES

- Automatically programs each of **36** wells in sequence for scheduled test.
- Separates oil, gas, and water.
- Measures the oil and water in the National Type B Liqua-Meters located in the legs of the National O-G-W MONOTUBE® SEPARATOR.
- Accumulates the volume of each product on the reset counters on the control panel.
- Strip Chart Recorder records production in relation to time.
- Separated products commingled and returned to the production line after test.
- Electric control panel actuates the pneumatic operated MANI-FLO valves to place well on test or production.
- Pictured unit does not measure or record gas production, but facility may be added at nominal cost on the same skid.
- Any power failure diverts all valves to production.
- Wells may be shut in manually with handwheel on bottom of MANI-FLO valve.

CONTROL PANEL
Weatherproofed and rain shielded. Clear plastic window allows complete visibility of all counters, well selector switches, and Strip Chart Recorder. Light indicates well on test.

STRIP CHART Recorder indicates:
Best production hours.
If well is flowing and/or surging.
Proper operation of pumping well.
Accurate well performance.

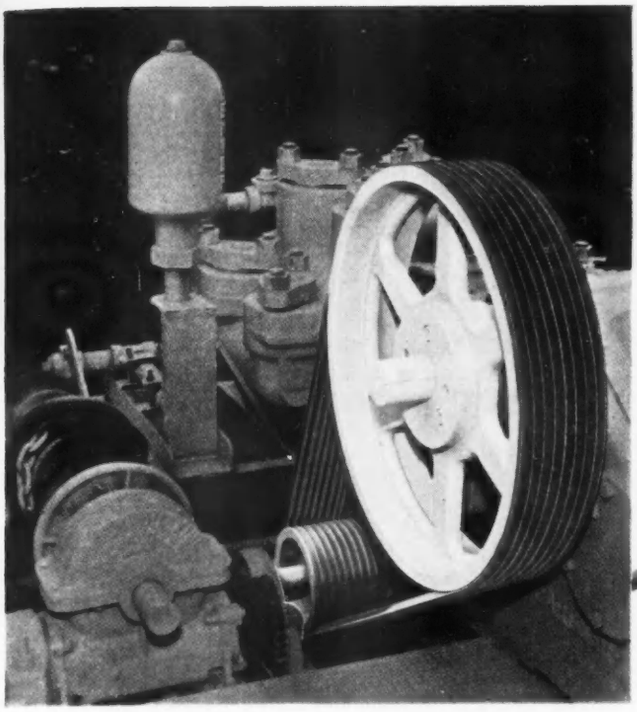
A Plus Value With All National Products . . . Engineers and field crews living in your area with stocked warehouses, complete units or parts ready to size, install and service National Well Test Units!

It's a National®

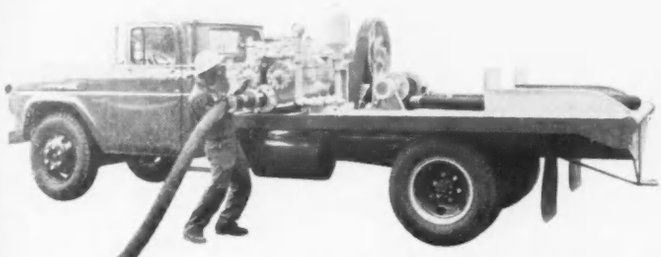
NATIONAL TANK COMPANY

DRAWER 1710

TULSA, OKLAHOMA



Compactness of Super HC High Capacity V-Belt Drive was major factor in choice—saving of $33.75 was 'bonus'.



A product of Well Drilling Equipment Manufacturing, this truck rig with permanently mounted Gardner-Denver Mud Pump used in conjunction with Scott-Hycalog Power Swivel can be run right up to the job and be working in a matter of minutes.

with new High Capacity Drives

rig manufacturer SAVES

43% drive space
223 pounds drive weight
$33.75 drive cost

on each unit!

Conventional drives used on truck-mounted mud-pump rigs produced by Well Drilling Equipment Manufacturing, Inc., of Clare, Michigan, presented a problem: sheaves were too wide and too large in diameter to keep rig as compact as its designers wanted it to be.

Paul Scott, the company's President, considered other possibilities and finally chose Gates Super HC High Capacity V-Belt Drive to transmit power to the Gardner-Denver Mud Pump incorporated on each rig.

Result: face width of sheaves was not only reduced to 5-13/16 inches, a saving of 43% in space, but total drive weight was cut by 223 pounds, a saving of 48%! And a bonus was realized—the Super HC High Capacity Drive cost $33.75 LESS than the former drive.

Mr. Scott reports that, after seven months on their rigs in the field, Super HC High Capacity Drives have withstood all shock loads, with no maintenance whatsoever—and praises them further for "economy, pulling power, ease of assembly, appearance and compactness."

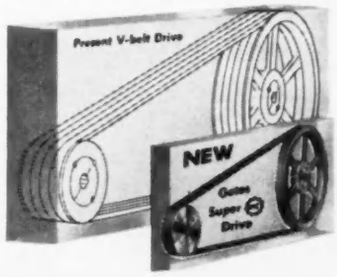
Stocks and Technical Assistance Available

Stocks of Gates Super HC High Capacity V-Belts and V-Belt Drives are located in all principal industrial centers—where you will also find a Gates Office or Gates Distributor ready to help you with any power-transmission problem involving drives. Look for them in the Yellow Pages of your phone book. Ask for Booklet: *The Modern Way to Design Multiple V-Belt Drives.*

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates The Mark of *Specialized* Research

TPA546



Gates Super HC HIGH CAPACITY V-Belt Drives same hp capacity in smaller "package"

Good Wells Make Good News

A Report on Recent Profit-Increasing "Workover" Treatments

December, 1960

"Workover" treatments by Dowell have made many old wells more profitable to their operators. Here are four recent examples showing how Dowell products and services improved wells for operators:

- **Lea County, New Mexico** (Old Oil Well) This well, completed in the Drinkard formation of the Blineberry pool, had lost production completely due to gyp deposits. First, 200 gallons regular acid with surfactant added were spotted on bottom for 24 hours and then pumped out. Next, a 600-gallon solution containing 180 gallons of Versene® 100, water, and a surfactant was spotted on bottom. This solution was allowed to soak for 48 hours, then circulated for 24 hours. After treatment, well flowed 140 bopd.

- **Saskatchewan, Canada** (Old Oil Well) This well, completed into the Mississippian in 1957, was given several acid treatments with no results. Well was temporarily abandoned. Dowell recently suggested Abrasijet* — Dowell's abrasive jetting service — to slot casing and formation. Four slots were cut — two at 4584 and 4585 feet, and two between 4571 and 4575 feet. 12,000 pounds of 20-40 mesh sand were used. Differential pressure across jets was from 3000 to 3500 psi. Well started making 25 bopd. Treatment cost of $1185.00 is expected to pay out quickly. In addition, a valuable well was saved.

- **Gray County, Texas Panhandle** (Old Oil Well) This Panhandle dolomite well had been shot with nitro from 2885 to 3285 feet on initial completion. Subsequent treatments included several acidizing and fracturing jobs. Production had dropped to 7 bopd. Dowell fractured using 16,000 gallons gelled water, 80,000 pounds sand and 5000 pounds salt. Treatment was divided into two equal stages. Salt was injected with 1500 gallons frac oil between stages to act as a temporary plugging material. Injection rate of fracturing fluid was 45 bpm. Pressure was zero during first stage and 300 psi during second. 45 days after treatment, daily production was 42 bopd.

- **Crook County, Wyoming** (Old Oil Well) Production from this well had declined from 200 bopd after fracturing on initial completion early in 1959 to 80-90 bopd just before treatment on August 1, 1960. Pay was the Dakota sand of the Miller Creek pool from 5924 to 5944 feet. Dowell used the "Frac Guide"* to help plan a treatment for this well. A 250-gallon Mud Acid spearhead was followed by Petrojel*. 20,000 gallons gelled lease crude with fluid loss additive carried 20,000 pounds sand. Injection rate was 24 bpm at 1800-2300 psi. Production 30 days after treatment was 480 bopd flowing. Cost of the frac job was paid out in less than 10 days.

Investigate the many services and products offered by Dowell to help you boost profits by making your wells worth more. For detailed information — or for prompt service — dial Dowell. Dowell services and products are offered from more than 150 offices and stations in the United States, Canada, Venezuela, Argentina, France, Germany and the Sahara area. Dowell, Tulsa 1, Oklahoma.

*DOWELL TRADEMARK

Services for the oil industry DOWELL

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Wire Rope at Work in the Azalea Field. At the time of the photograph, the BBM Drilling Company was 10,200-ft deep in this well in the Azalea Field, Midland County, Texas. The Bethlehem Wire Rope, 1¼ in. 6 x 19 Seale, Formset Purple Strand, right lay, with IWRC, had been in service for some time. Yet it still was in superb condition, ready to chalk up many additional ton-miles.

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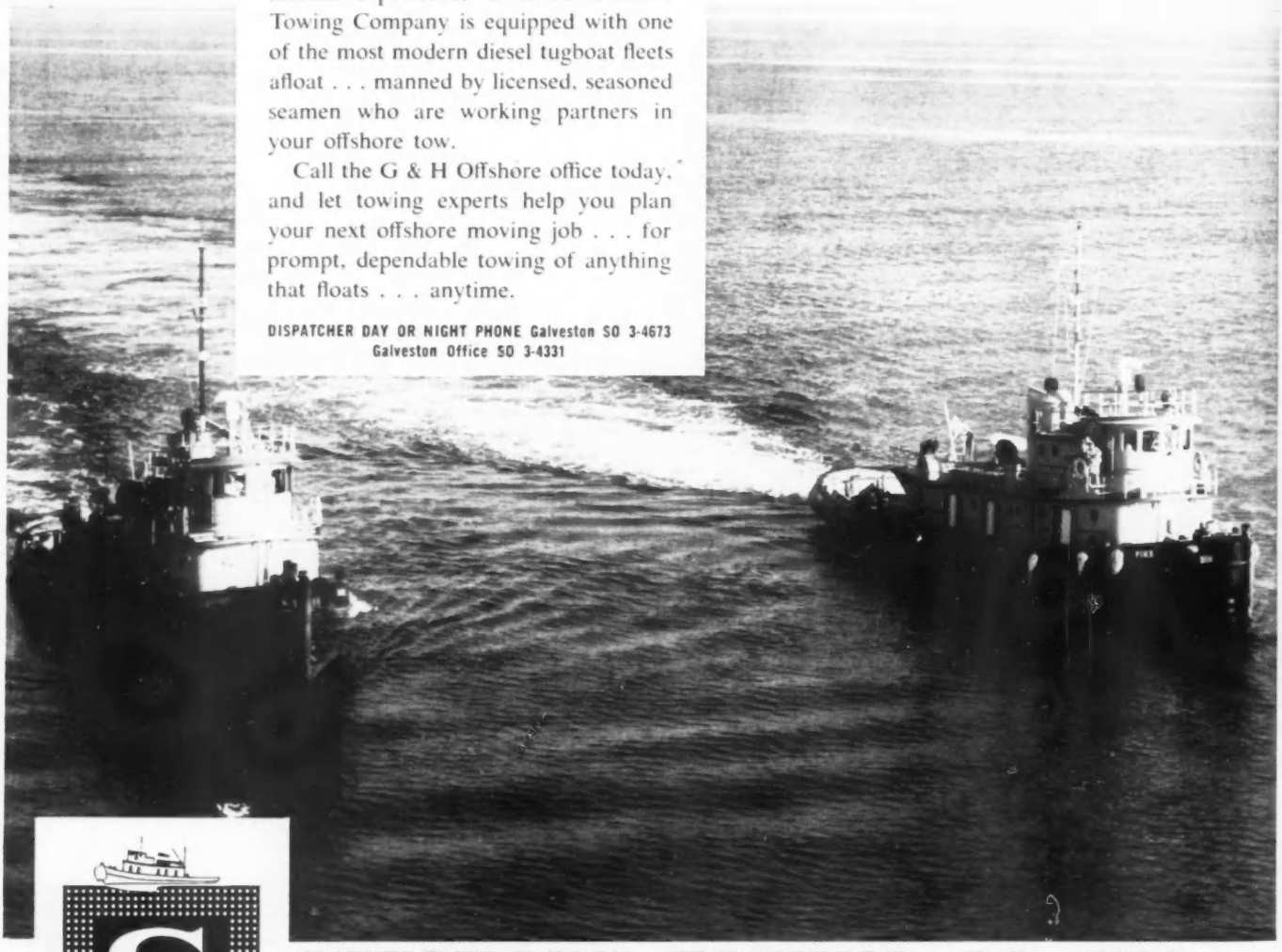

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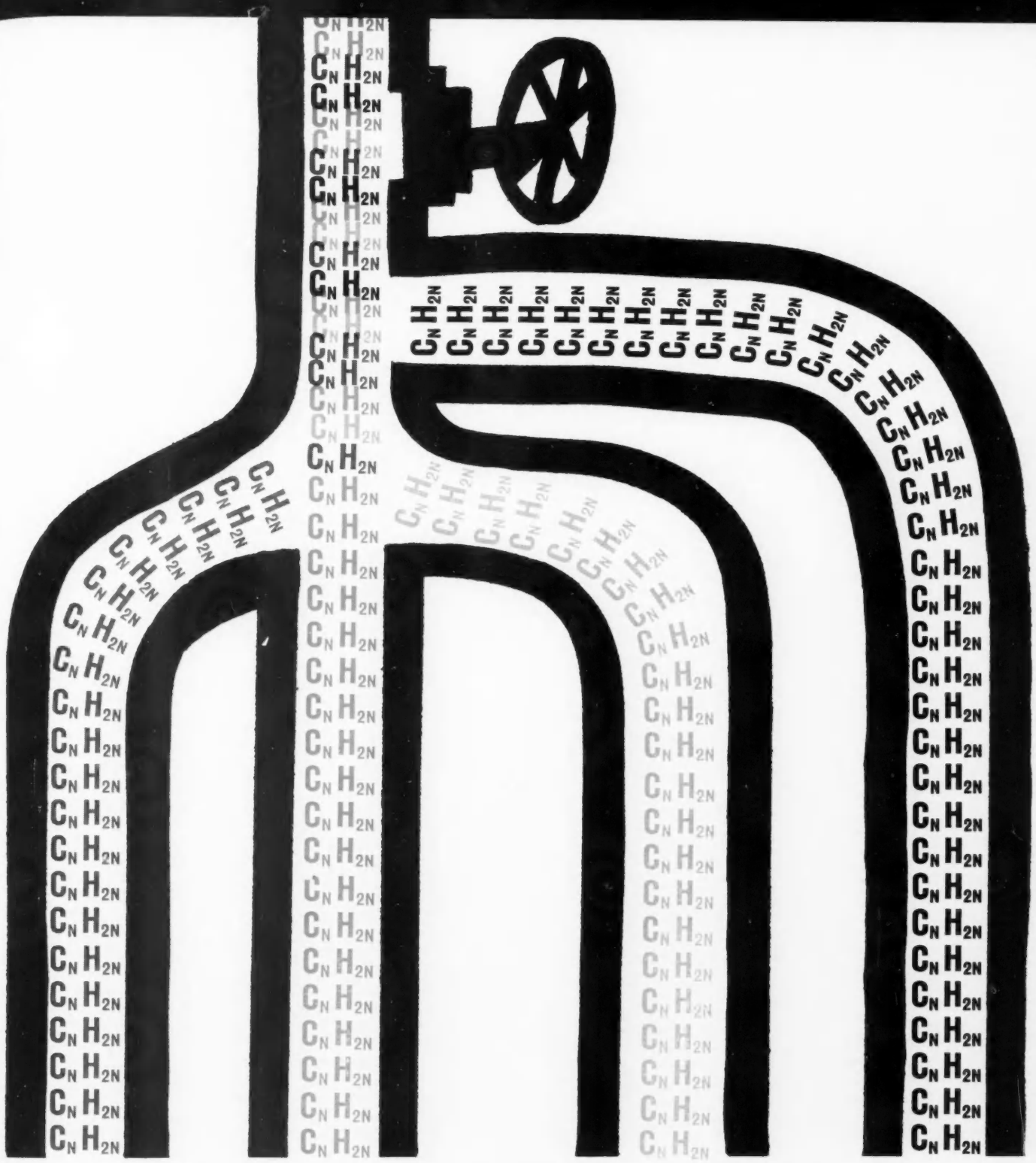

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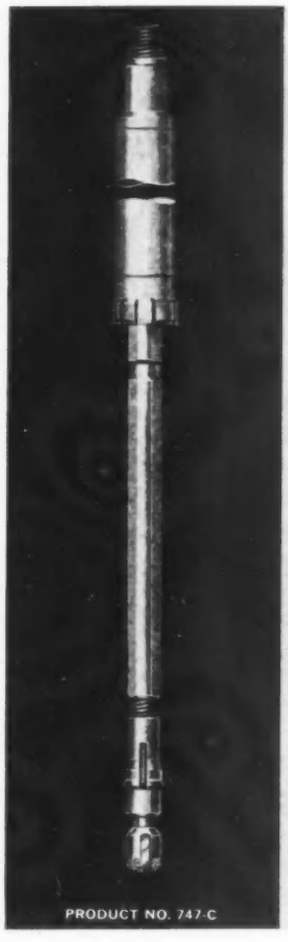

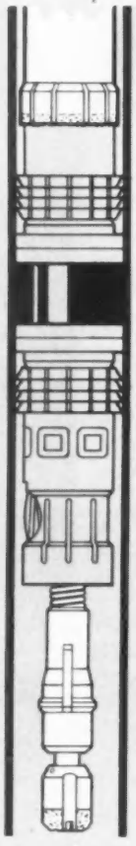

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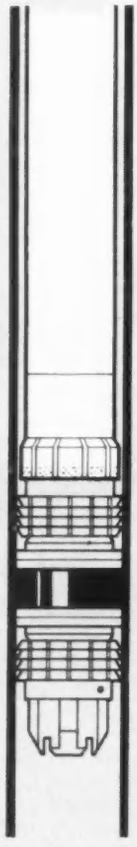
with retrieving stinger & latch... Mills Over and Retrieves any Baker Retainer Production Packer, retainer-type packer or Baker Bridge Plug.



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Mills Over and pushes to bottom any retainer-type packer, bridge plug or cement retainer ...one or two at a time.

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Ask your Baker man for more information; or write to: Baker Oil Tools, Inc., Box 2274, Terminal Annex, Los Angeles 54, California.

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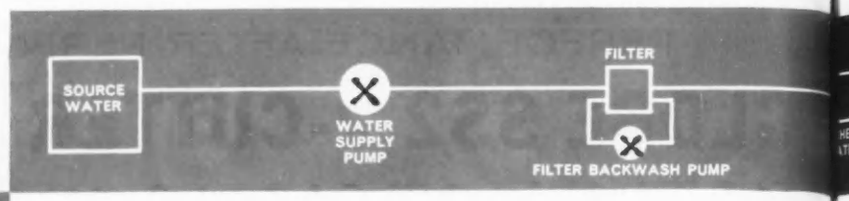
For more data on advertised products, use Readers' Service Cards, last page.



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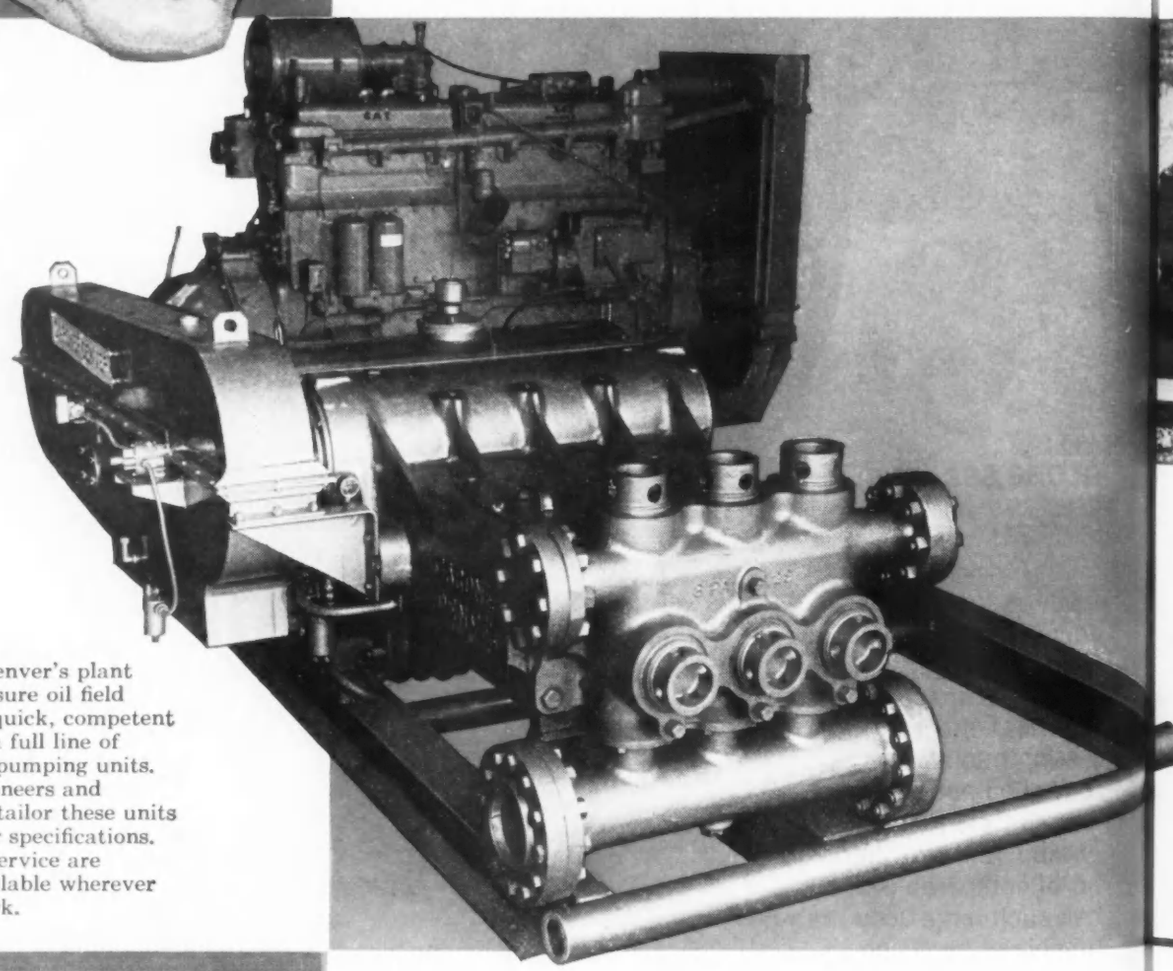

Gardner-Denver's plant facilities assure oil field customers quick, competent service on a full line of waterflood pumping units. Expert engineers and machinists tailor these units to customer specifications. Parts and service are readily available wherever oil men work.

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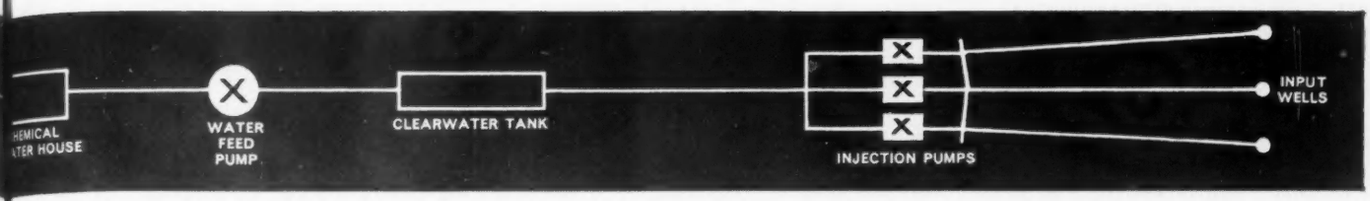
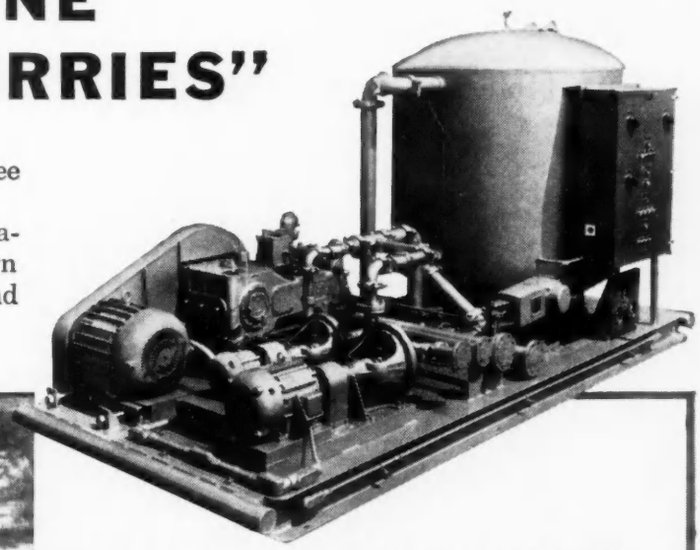
EXPERIENCED HELP—When production men want to boost well output, they need a pump package engineered to particular field conditions. Gardner-Denver's knowledge, accumulated through decades of oil field service, can help you determine the exact combination you need.



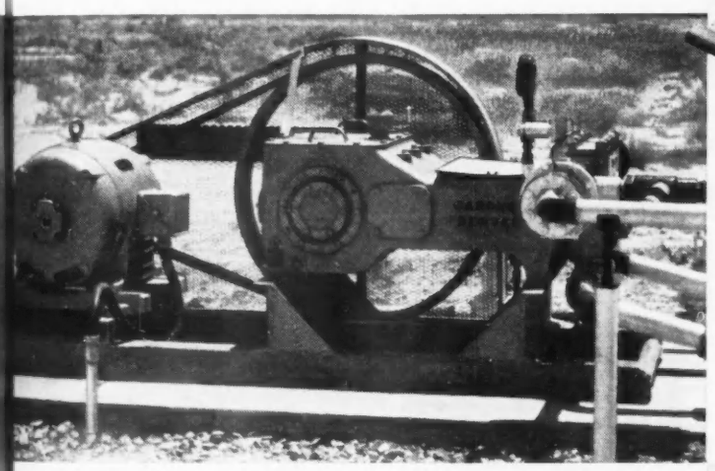
WATERFLOOD LINE ENDS PUMP WORRIES"

on the waterflood job, he's assured of worry-free operation—continuously.

To end your pump worries on waterflood operations, specify Gardner-Denver pumps right down the line—for water supply, filter backwash and water feed, as well as water injection.

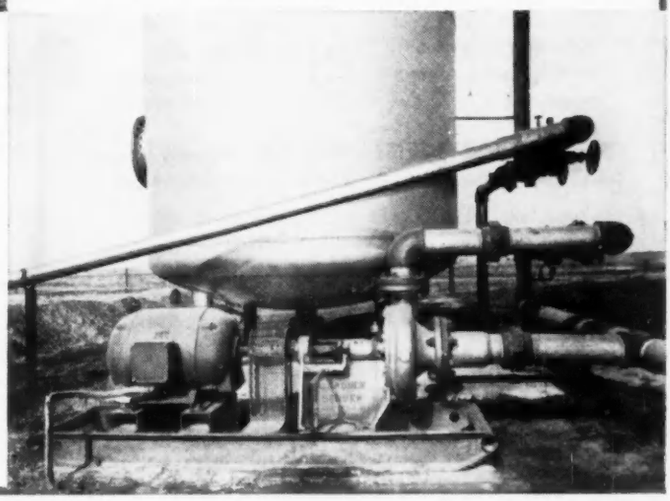


Gardner-Denver's new portable water injection and filter system unit is self-contained, portable and automatic. It includes triplex plunger injection pump, separate backwash and filter cycle pumps, filter tank, electric motors, piping and controls—all compactly mounted on an oil field skid.

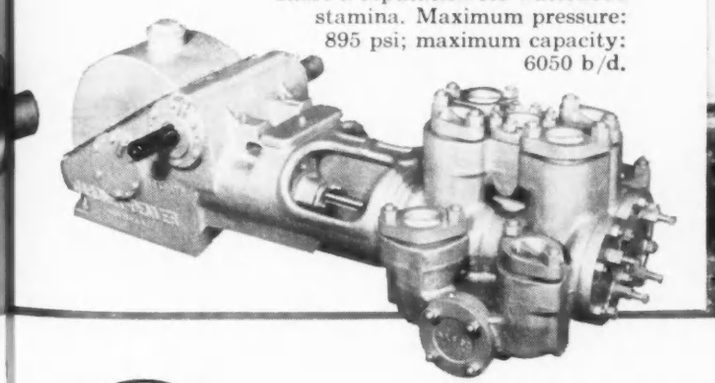


Gardner-Denver's broad range of centrifugal pumps are rated for volumes up to 4800 gpm or for heads up to 300 feet.

Gardner-Denver triplex plunger pumps have ratings of 15 to 200 hp, maximum pressure of 3050 psi, maximum capacity of 12,950 b/d.



Gardner-Denver duplex piston pumps share a reputation for waterflood stamina. Maximum pressure: 895 psi; maximum capacity: 6050 b/d.



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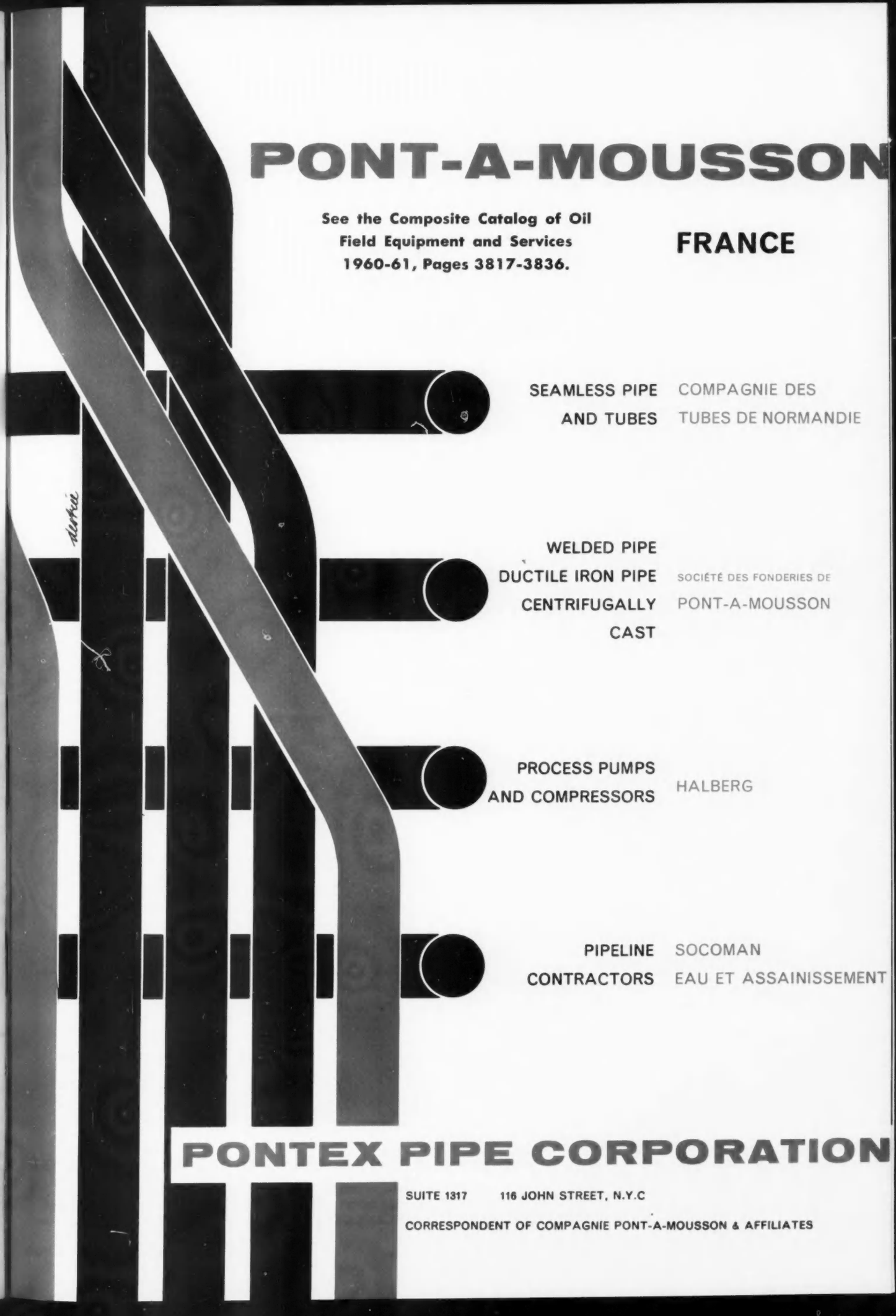

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See the Composite Catalog of Oil Field Equipment and Services 1960-61, Pages 3817-3836.

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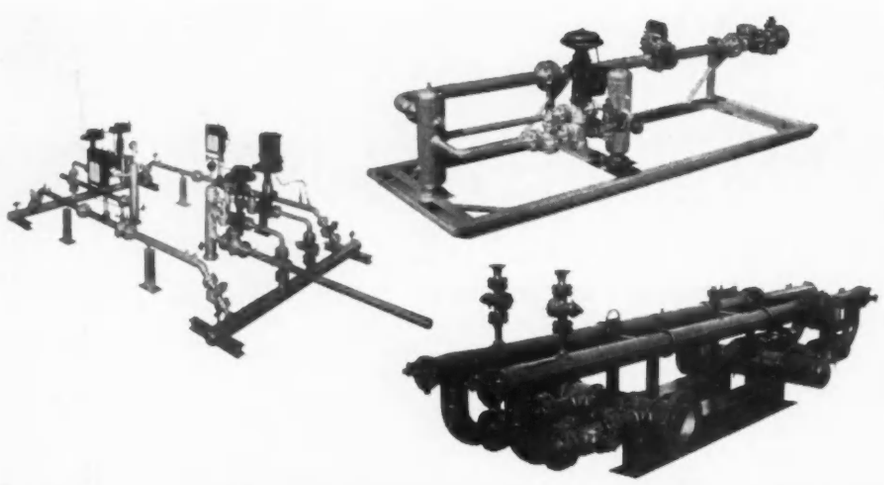

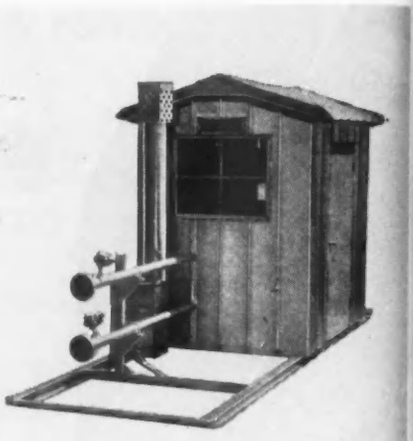

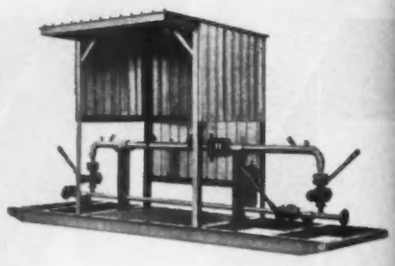

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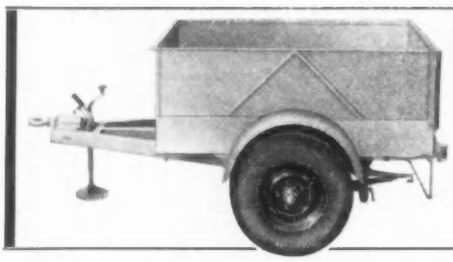
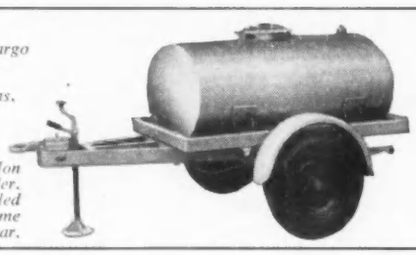
STANDARD OR FEZZAN Made in two ranges. "Standard" —suitable for ninety per cent of operations, and "Fezzan", an ultra tough version, proved in Libya, one of the most difficult areas in the world.

* *Whatever your trailer problem, Scottorn have the answer!*



"Fezzan" Dual Purpose Trailer. Cargo capacity 1 ton plus liquid capacity 120 Imperial gallons.



"Fezzan" 250 gallon Tanker Trailer. Welded 4"x 2" rolled steel channel frame and towbar.

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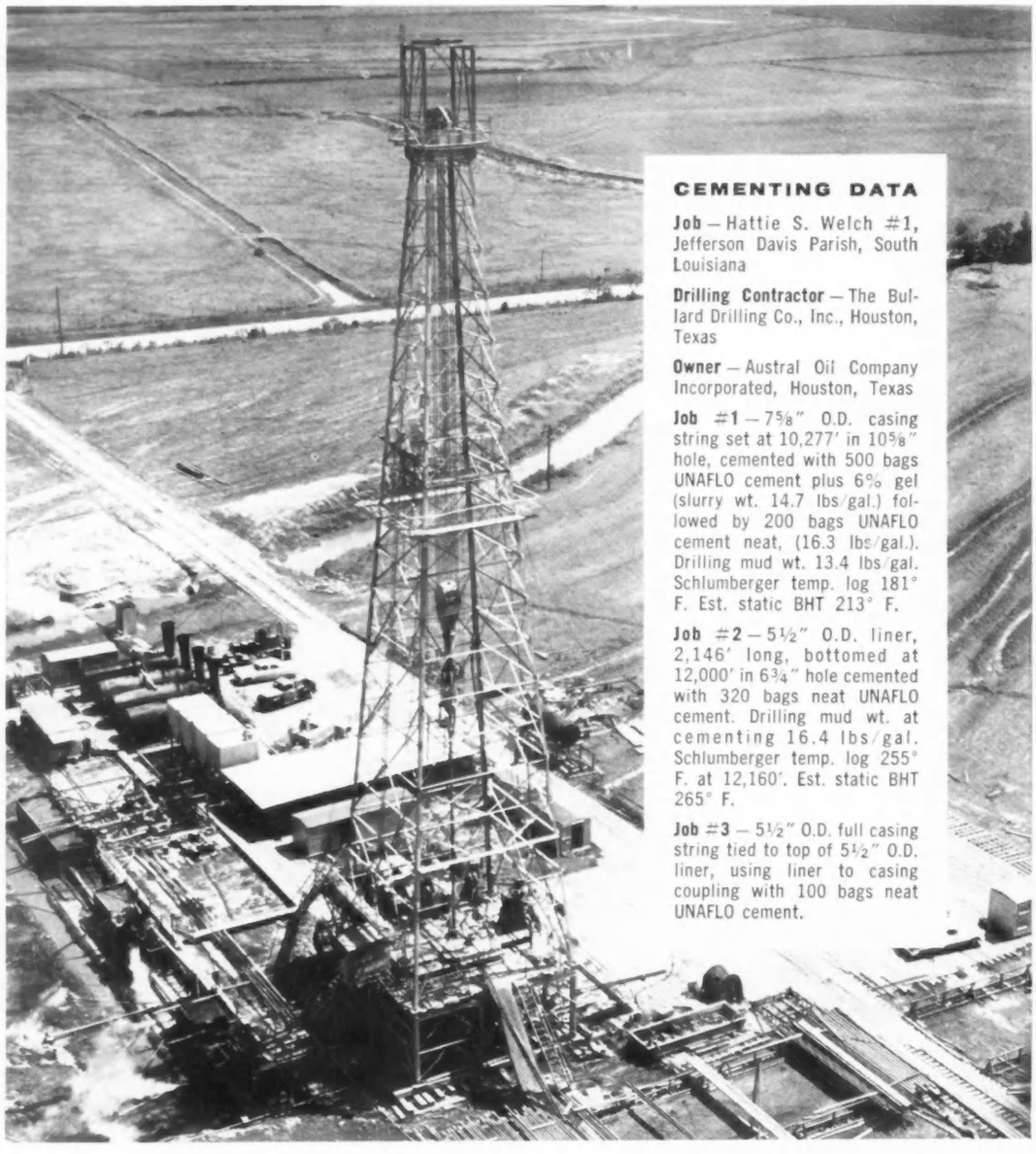

CEMENTING DATA

Job – Hattie S. Welch #1, Jefferson Davis Parish, South Louisiana

Drilling Contractor – The Bullard Drilling Co., Inc., Houston, Texas

Owner – Austral Oil Company Incorporated, Houston, Texas

Job #1 – 7⅝" O.D. casing string set at 10,277' in 10⅝" hole, cemented with 500 bags UNAFLO cement plus 6% gel (slurry wt. 14.7 lbs/gal.) followed by 200 bags UNAFLO cement neat, (16.3 lbs/gal.). Drilling mud wt. 13.4 lbs/gal. Schlumberger temp. log 181° F. Est. static BHT 213° F.

Job #2 – 5½" O.D. liner, 2,146' long, bottomed at 12,000' in 6¾" hole cemented with 320 bags neat UNAFLO cement. Drilling mud wt. at cementing 16.4 lbs/gal. Schlumberger temp. log 255° F. at 12,160'. Est. static BHT 265° F.

Job #3 – 5½" O.D. full casing string tied to top of 5½" O.D. liner, using liner to casing coupling with 100 bags neat UNAFLO cement.

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MERRY CHRISTMAS and HAPPY NEW YEAR

Smith TOOL CO.

Economy never came in such a choice!

NEW FORD TRUCKS

FOR 1961

619 NEW MODELS! All engineered with one idea in mind . . . economy! New "Big Six" engine for 2-tonners plus five Cummins diesels for the new H-Series tractors expand the proven line of Ford engines to 18—with one just right for your job. A wider-than-ever choice of transmissions and axles. And . . . on all 1961 Ford Trucks, each part, except tires and tubes, is now warranted by your dealer against defects in material and workmanship for 12 months or 12,000 miles, whichever occurs first. The warranty does not apply, of course, to normal maintenance service or to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points.

FORD TRUCKS COST LESS

YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE!

New! Durable Tandems

Ford's Tandem Axle trucks for '61 are engineered to give you greater flexibility and significant payload advancements. Your choice of 22,000-lb., 28,000-lb., 30,000-lb., 34,000-lb., or 38,000-lb. axle capacity. New, longer wheelbases are available to permit installation of special bodies up to 21 feet long. Aluminum walking beams as well as aluminum wheels and gas tanks are optional for reduced chassis weights.

FORD DIVISION, *Ford Motor Company*

New!
Space-Saving Tilts

Ford's popular Tilt Cab Series outsells all the other makes and for good reason! Compact 82-inch BBC permits longer bodies for a given over-all length, and wide-track front axle makes it more maneuverable for congested area work. Ford offers the lowest-priced* tilt-cab model in the industry! And for '61, the bigger Ford Tilts are available with a lightweight, fiberglass sleeper cab compartment that adds only 2½ inches to the standard BBC dimension.

*Based on a comparison of latest available manufacturers' suggested retail delivered prices

New! H-Series Diesel- or Gas-Powered Tractors

Ford's new H-Series tractors with 28-inch front axle setting and 82-inch BBC are offered in four single-axle and four tandem-axle models with over 500 engine-axle-transmission combinations. Choose from ten industry-accepted engines—five Cummins diesels and five Ford Super Duty V-8's!

New 100,000-mile warranty on Super Duty V-8 gas engines is most liberal in the industry. On 401-, 477- and 534-cu. in. V-8's, Ford Dealers will replace any major engine part (including block, heads, crankshaft, bearings, valves, pistons, rings) found to be defective in materials and workmanship in normal on-highway use. Warranty covers full cost of replacement parts for 100,000 miles or 24 months, whichever occurs first . . . full labor costs for first year or 50,000 miles, sliding percentage scale thereafter.

HEAVY TRUCK GENUINE PARTS Ford SERVICE DIESEL CUMMINS

NATIONWIDE SERVICE . . . *look for this sign at Ford Dealers' across the country, for service on all Ford gas and diesel trucks!*

New! "Big Six" Engine

More power for America's savingest 2-tonners . . . a big 262-cu. in. Six with the performance of big displacement, the durability of heavy-duty construction, plus the gas economy of 6-cylinder design! Available early 1961. You also get improved riding comfort with new smoother-acting springs and a sturdy truck suspension system that can give up to twice the front tire life of some other makes.

New! 4-Wheel Drive Pickups

Ford offers the lowest-priced* 4 x 4 with big 8-ft. box. And these models have the getup and traction to go most anywhere . . . road or no road! You can choose from two modern engines—the gas-saving 135-hp Six or the 160-hp V-8 that gives extra power and smoothness with "six-like" economy.

Season's Greetings

1960

Our Pledge

Many thanks for your past favors,
Sent with wishes most sincere
And Our Pledge of faithful service,
Throughout all the coming year

THE **Bovaird**
SUPPLY COMPANY

String-up with QUALITY

Yellow Strand "POWERSTEEL"

In these days of deeper wells and faster line speeds, it pays to equip your rigs with Yellow Strand "POWERSTEEL" rotary drilling lines. Here's a built-in ruggedness to combat the shock, strain and wear of today's tough drilling . . . giving you maximum ton-mile service. "POWERSTEEL" rotary lines are made from wire having the highest tensile strength and wear resistance of any Broderick & Bascom wire rope. You gain the safety and assurance of high reserve strength, too.

Ask about the Broderick & Bascom "Tailored Cut-Off Plan." It is scientifically designed for each individual rig, and lowers rotary drilling costs by giving longer ton-mile service.

For Service that Sings.. Equipment that Hums.. Go..

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Plants: Houston and Garland, Texas;
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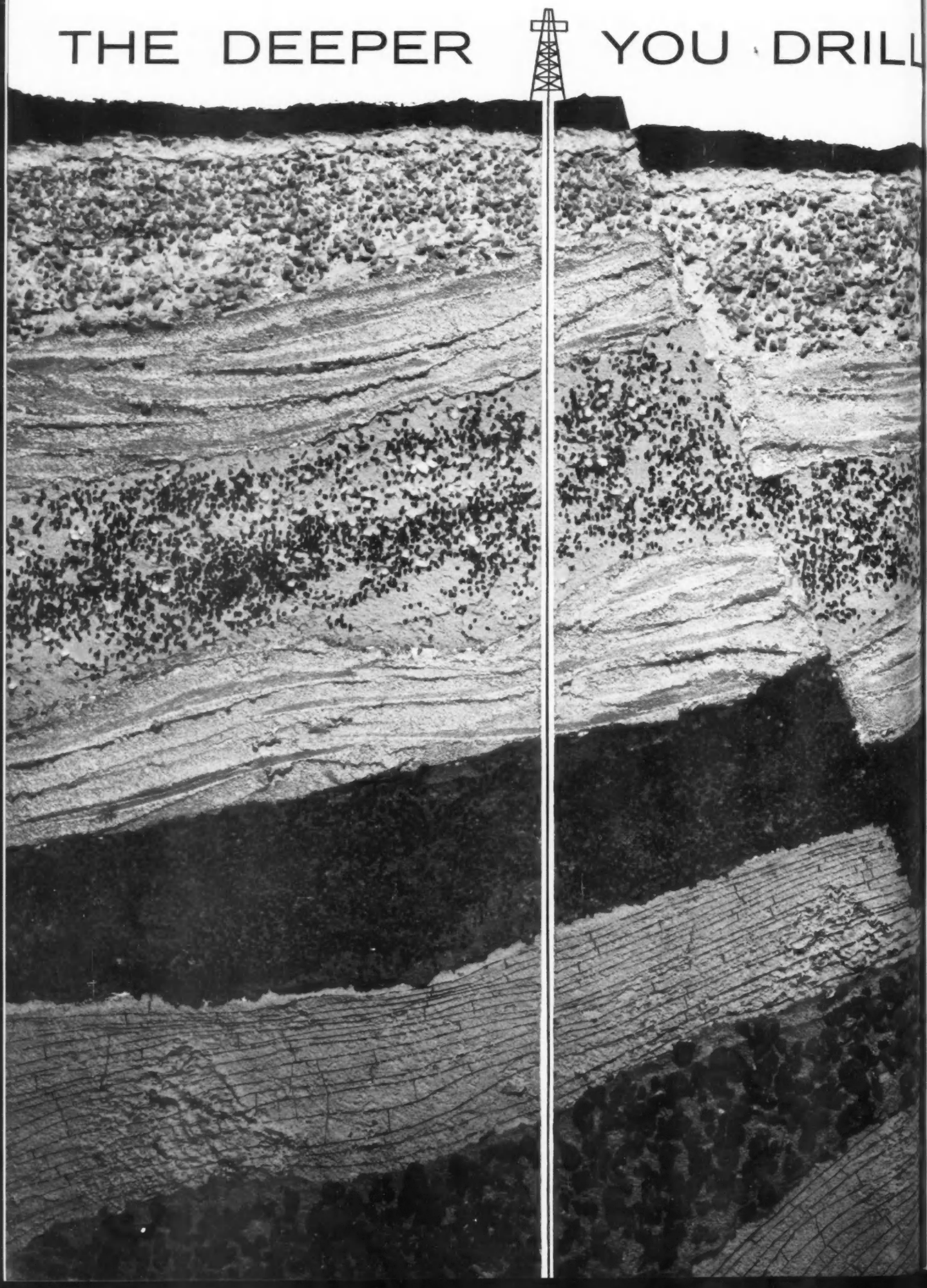
Representatives in All Principal Oil Fields of the World

BB902


THE DEEPER
YOU DRILL

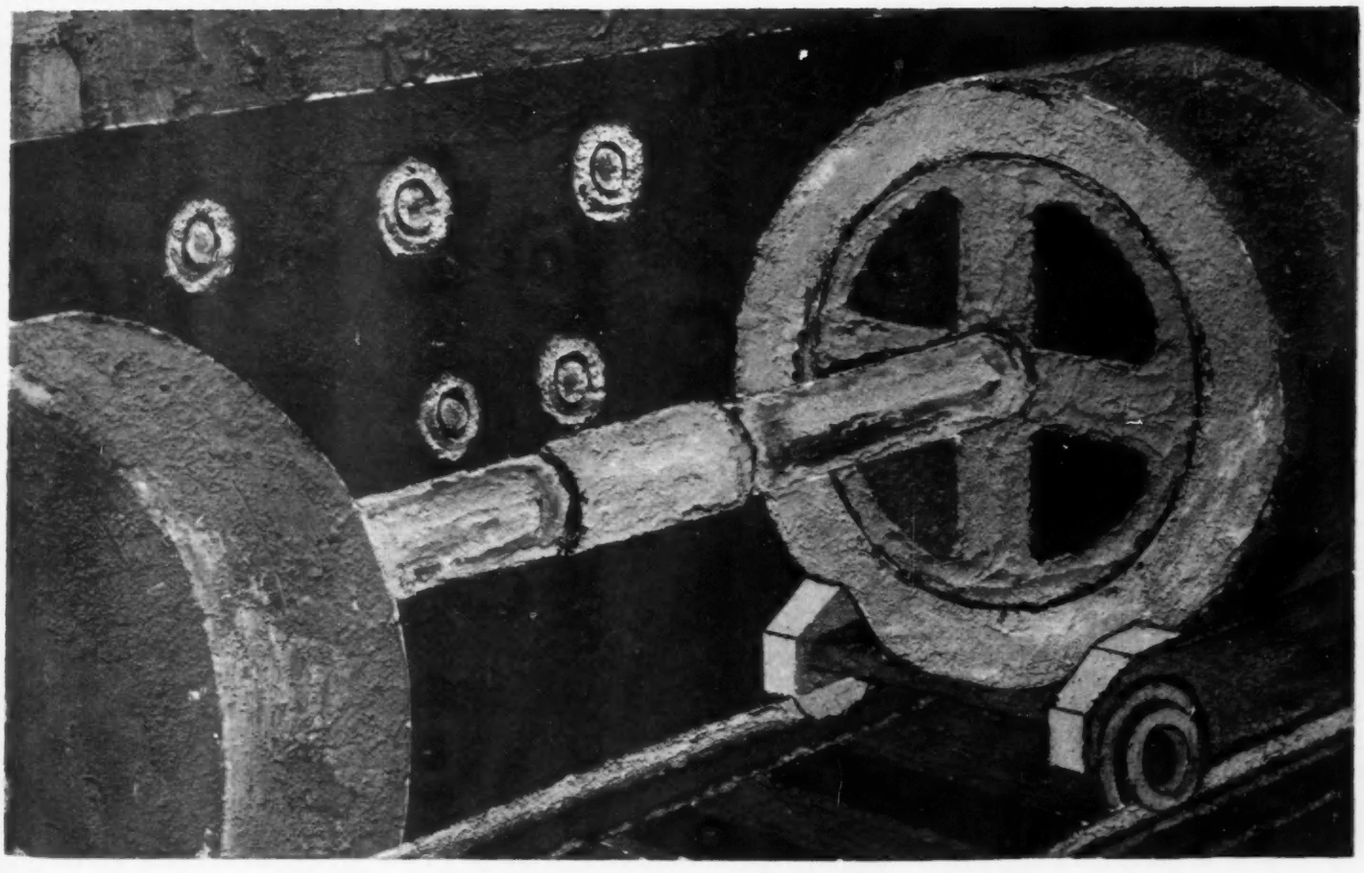
THE HARDER WE PULL

Ask a geologist how far you can drill a hole into the earth, and he might say, "Half-way . . . after that, you're drilling *out of,* not into."

The problem of hole depth is more than a riddle for oil men. They *have* to drill deeper and deeper every year, and their limit depends on the strength and durability of the tubular products they use.

At National Tube, drill pipe is tested under strain far in excess of anything encountered in the field. The type of equipment used can exert a 2,000-ton pull. So go ahead and drill deeper. National Tube is pulling for you.

2,000-ton test equipment used in tensile test.



This mark tells you a product is made of modern, dependable Steel.

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

OIL KING!

Acknowledged so by oil men who have used all kinds of gauges

The ten-gallon hat on the Marsh Mastergauge is worn as a crown of acceptance, an emblem of excellence... well earned through years of rugged oil country service.

Just as kings ascend thrones through lineage, the Mastergauge was destined for "royal" acclaim the day it hit the drafting board. Because every product born at Marsh is "born to the purple."

For what other gauge has the Marsh heritage of functional design innovations? Only Marsh offers Conoweld construction, the Marshalloy case, "coined" sector Mastergauge movement, "Recalibrator" adjustment, and optional Safecase protection plus.

That's why we say the *next* great thing that happens in gauges will happen at Marsh.

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Division of Colorado Oil and Gas Corporation
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Houston Branch Plant, 1121 Rothwell St., Sect. 15, Houston, Texas

MARSH GAUGES

In stock at your nearest Supply House

"THE STANDARD OF ACCURACY"

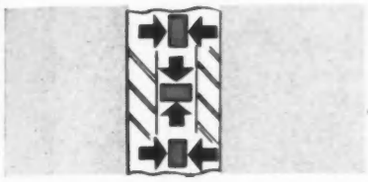
NOTHING excels this unit for AUTOMATIC PRESSURE CONTROL WHILE DRILLING!

THE SHAFFER ROTATING BLOW-OUT PREVENTER AND STRIPPER

has no equal in modern pressure control protection because no other equipment is so versatile... so simple... *so dependable!*

It *automatically* seals off around the drill string when the tools are in the well. You can run drill collars, tool joints, subs and drill pipe through it—going in or coming out—and *the Stripper Rubber maintains its pressure-tight seal throughout all drilling and pipe-changing operations.* Pressure emergencies simply cannot happen too fast for this unit. It is always sealed off until the drill string is removed from the well.

Check over the important features outlined below. You'll find the Shaffer Rotating Blowout Preventer and Stripper ideal for every important drilling requirement!

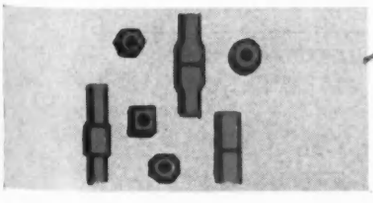


WEAR-FREE!

The Stripper Rubber rotates with the kelly—not one inside the other. Therefore, flexing and wear are negligible as the drill string rotates. Note that separate thrust and radial bearings (each pre-packed with heat-resisting lubricant) resist any combination of bearing loads!

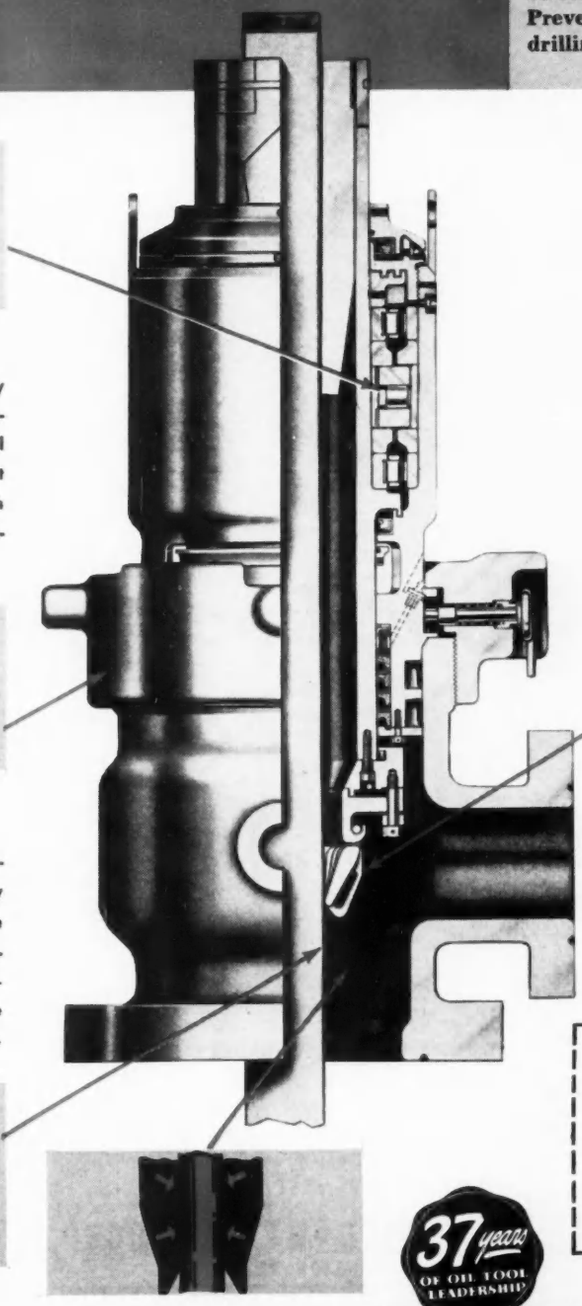
SIMPLE!

To pass bits, reamers and other abnormally-large diameter tools through the unit, simply lower the tools through the body until the rotating assembly seats in place. Then rotate the bonnet 1/6 turn. This locks the entire internal mechanism in place, to provide a continuous seal against well pressures.



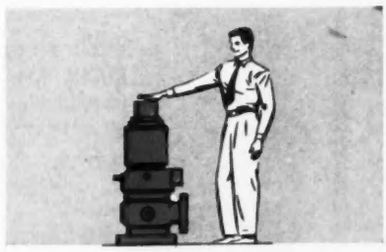
VERSATILE!

All the varying diameters in the drilling string—drill collars, tool joints, subs and drill pipe (whether upset, flush or coupled)—readily pass through the Stripper Rubber without loss of pressure—and without any manual adjustments. Even the kelly—whether square, hexagon or octagon—is sealed off *automatically!*



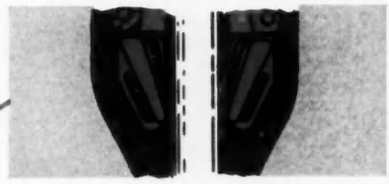
CONTINUOUS!

The Stripper Rubber expands and contracts automatically to fit all normal elements in the drill string (excepting only bits, reamers and similar large diameter tools). No hydraulic, pneumatic or mechanical pressure need be applied. No accessory equipment is required!



COMPACT!

Unit is amazingly compact in all dimensions—can be installed in unusually "tight" locations. Even flow connections are built-in—no space-wasting spools are required!



TROUBLE-FREE!

A barrier of flexible steel latches protects the Stripper Rubber against damage while varying diameters pass through the unit. This expandable steel barrier also protects the rubber from extrusion under high well pressures!

TWO TYPES—Use the Type 50 for drilling through 10¾" casing and larger... Use the Type 51 for slim hole drilling, production and rework jobs. Both have the same basic features!

For further details see your nearest Shaffer representative, or write direct!

37 years OF OIL TOOL LEADERSHIP

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HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

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FARMINGTON, NEW MEXICO, Shaffer Tool Works, Post Office Box 546
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WECO NO-GALL TOOL JOINT COMPOUND has more than 50% pure metallic zinc dispersed in a neutral oil with a tacky additive.

WECO LO-TORK TOOL JOINT COMPOUND has 50% metallic lead suspended in a neutral base with a tacky additive.

Treat Your Tool Joints to a WECO COMPOUND

WECO Tool Joint Compounds, LO-TORK or NO-GALL, are the treatment your tool joints need for longer life, trouble-free service, easier make-up and break-out. These Compounds meet every requirement for proper and efficient drill string thread lubrication. They provide low-friction make-up; will not squeeze out under high temperature or torque pressure; will not freeze the joint. They always remain soft in the can under all extremes of hot or cold weather for easy, time-saving application. They never require thinning.

WECO Compounds are stocked by Supply Stores everywhere for your convenience.

WECO® WELL EQUIPMENT MFG. CORP.
HOUSTON, TEXAS
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WECO UNIONS

CHIKSAN SWIVEL JOINTS

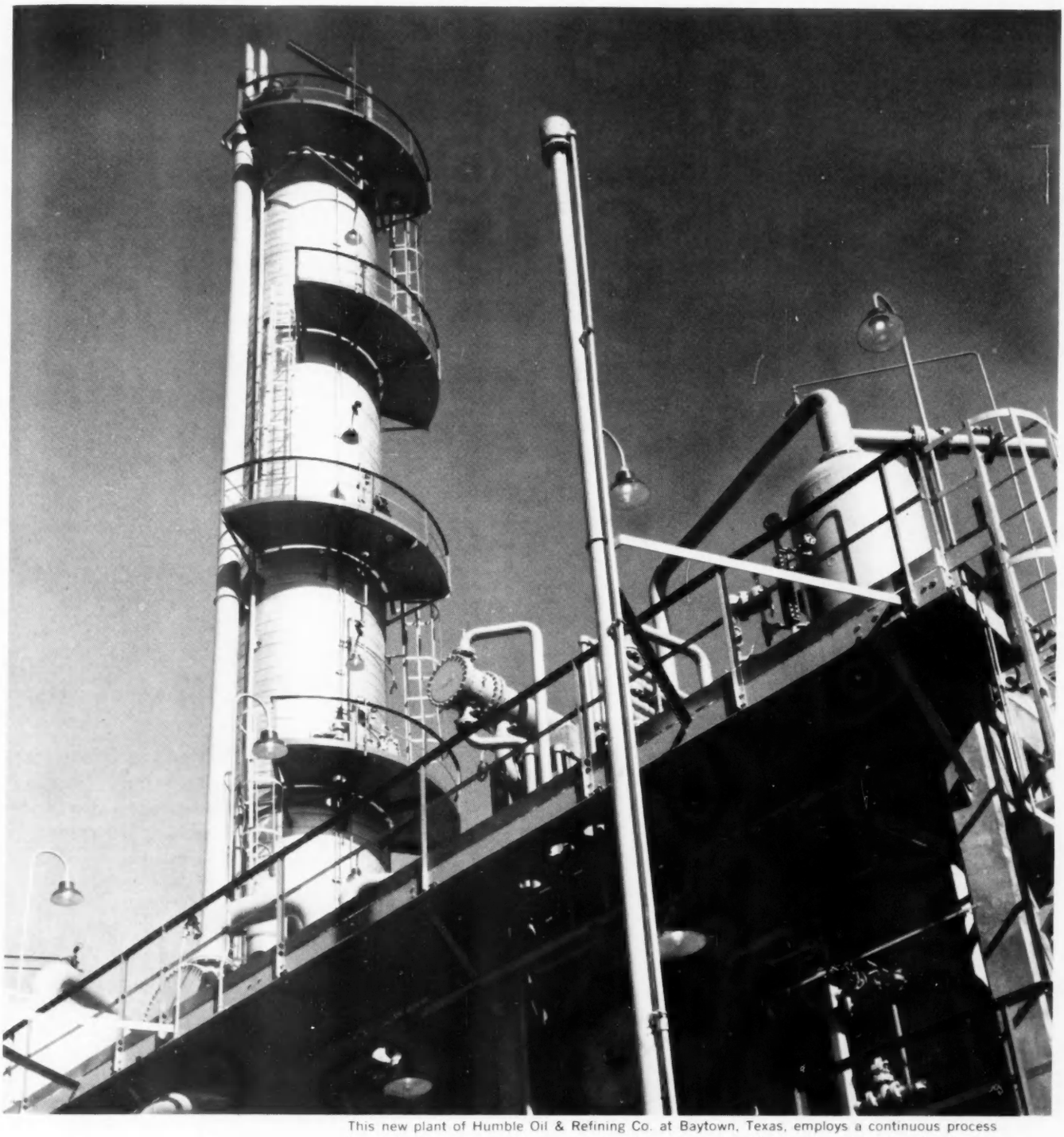
HAMER LINE BLIND VALVES

HAMER PLUG VALVES

WECO AIR-O-UNION

WECO COMPOUNDS

WECO SNATCH BLOCKS



This new plant of Humble Oil & Refining Co. at Baytown, Texas, employs a continuous process for producing large quantities of polypropylene - raw material for a wide variety of useful plastics.

"We cannot afford to be inefficient in the use of capital or labor. We must aim at increased national productivity; we must stimulate research and invention; we must reward ability and initiative; we must encourage capital generation and productive investment. If we fail to do these things we will move backward in the world picture instead of forward."

—Leo D. Welch, Chairman of the Board

Standard Oil Company (New Jersey)

MISSILES TO MUFFLERS

Bridge production gap for oil field manufacturer

Beaird-AMF A company on the go!

NEW PRODUCTS, SKILLS, IDEAS SPARK DRIVE

Under the guidance of a tall (6′3″) soft-spoken Texan, President John L. Tullis, Beaird is on the rebound from a low caused when the oil industry skidded into its own personal recession in 1958.

Long a major supplier of equipment (skid-mounted packaged compressors, pressure storage vessels, rail tank car tanks, steel piling, LP-Gas transports and home LP-Gas systems), Beaird has repeatedly demonstrated its ability to move swiftly in a competitive situation. Pioneering with the first packaged compressor plant in 1946, they established and dominated the market for this product despite intensive competition. Equally in the LP-Gas industry, Beaird moved, in five years, from its first LP-Gas system in 1946 to the industry leadership, with a host of products serving every phase of the market from dealer to home.

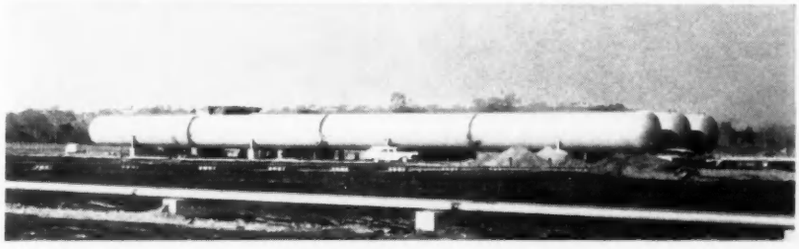
Now entering new markets with new creatively engineered products ("Belex," a self-operated condensate recovery unit for installation at wellheads and a skid-mounted complete gasoline plant composed of eight separate processing units), Beaird has received an additional boost from acquisitions and defense contracts. Maxim, the oldest name in silencers (gross sales $3,000,000 in 1959) has been acquired by AMF and assigned to Beaird to manufacture and market. The bustling shop program is also producing an $8,500,000 order for giant Atlas Missile launching components and a large order for stainless steel Titan missile fuel tanks. Beaird has targeted a stepped-up sales goal in '60 and is headed upward with a rush that may well take it far beyond its most optimistic predictions. From its people in the shops to its wide-flung dealer and sales organization, there is a firm belief that Beaird-AMF is a company on the go . . . *and getting there in a hurry!*

BEAIRD - AMF

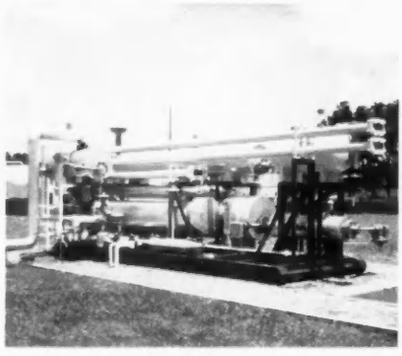
World's Largest Fabricator of LP-Gas Systems

Long lasting enamel finish is just one of many basic improvements Beaird has brought to LP-Gas industry. To make new finish possible Beaird installed giant "assembly line" plate shot blast equipment at both Shreveport and Clinton plants. Beaird has continued to strengthen its LP-Gas market position with a vigorous dealer program that includes area stocking and long term financing.

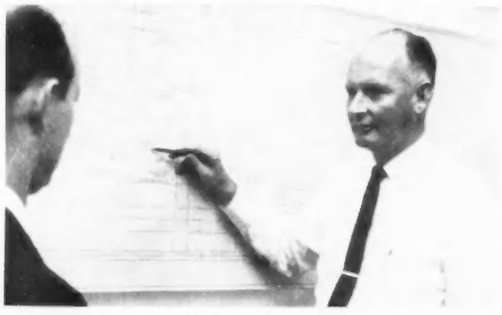
CO_2 Transport, has welded aluminum shell over four inches of insulation that surrounds the T-1 steel . . . 325 psi tank. Other specialized Beaird units are formed of stainless steel for chemical hauling. T-1 Steel Transports for LP-Gas Market lead Beaird transport sales.



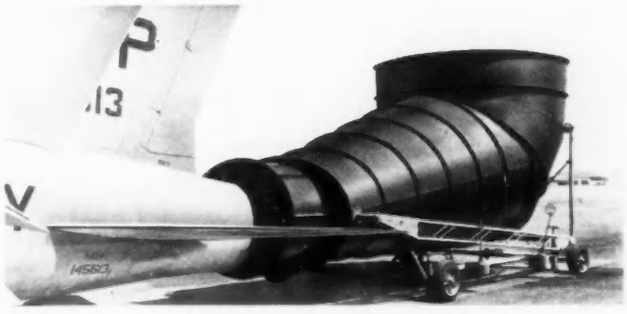
World's largest LP-Gas storage vessels — capacity 5,000 bbls. each were built by Beaird for Creole Petroleum, Venezuela. One of firm's oldest and best known products, Beaird storage vessels are manufactured in a size range from 6,000 wg. to 105,000 wg. capacity for the oil, gas and petrochemical industries.



Belex Condensate Recovery unit, mounts at wellhead to extract hydrocarbons (gasoline, propanes, methanes, etc.). Fully packaged and automatic in operation, the Belex unit offers high product recovery with low installation cost.



10,000,000 Cubic Feet of Gas per Day can be handled by this Beaird Skid Mounted Gasoline Plant. Expensive field labor and installation hook-up is reduced to minimum and the plant is almost wholly salvable when moved to a new location. It was process engineered and installed by O. L. Olson Engineering, Houston, Texas.



Twenty-five ton silencer, one of the many Maxim silencers now produced by Beaird. Others include little two-pound units for home lawn mowers, sizes for heavy duty engines and special types for ships and industrial plants.

Navy Submarine has an AMF-Maxim monel and stainless steel sea water plant which demonstrates Beaird's new metal handling skills. Fabrication including welding of aluminum and magnesium for rail tank cars as well as work in other exotic metals has become a routine assignment at Beaird.

another AMF BEAIRD product

THE J. B. BEAIRD COMPANY, INC.

A subsidiary of American Machine & Foundry Company

SHREVEPORT, LOUISIANA

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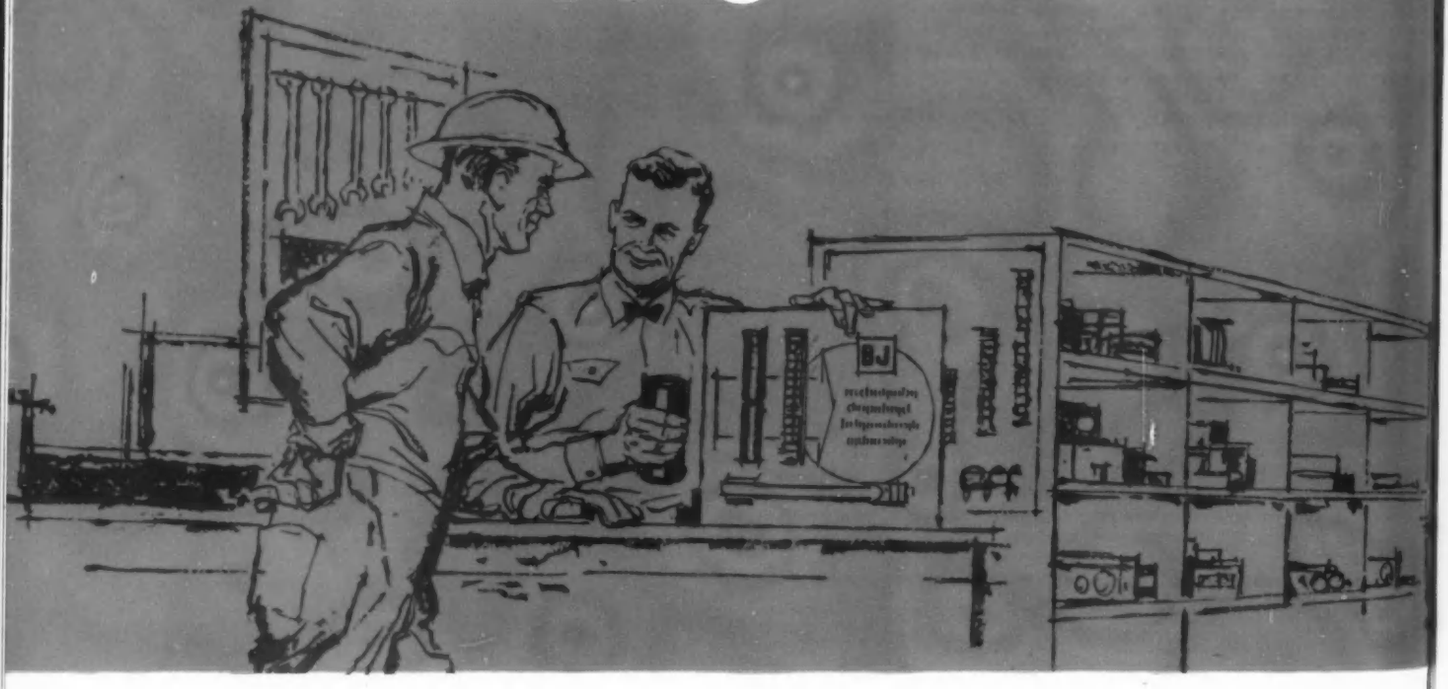
BEAIRD INTERNATIONAL, INC.

SHREVEPORT, LOUISIANA

BJ PB

oil field products sold only through supply stores!



The supply store—like the equipment manufacturer—is basic to the business of oil drilling and production. Both are working for you. That is why, for 32 years, BJ and PB oil field products have been sold only through supply stores—why this will continue to be Byron Jackson's unvarying policy in the future. Dealing with your local supply store is good business for you. Good business because this modern industrial "supermarket" is an immediate source of tools, parts and equipment in the sizes and types you need—when you need them. Good business because the supply store offers the advantages of "charge account" buying. Good business because it eliminates the need to tie up your working capital in costly parts inventories. Good business because buying at your supply store is your best assurance of getting products of the highest quality. And quality—Byron Jackson quality—does cost less in the long run.

Byron Jackson Tools, Inc.

A SUBSIDIARY OF BORG-WARNER CORPORATION

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BJ

QUALITY COSTS LESS IN THE LONG RUN

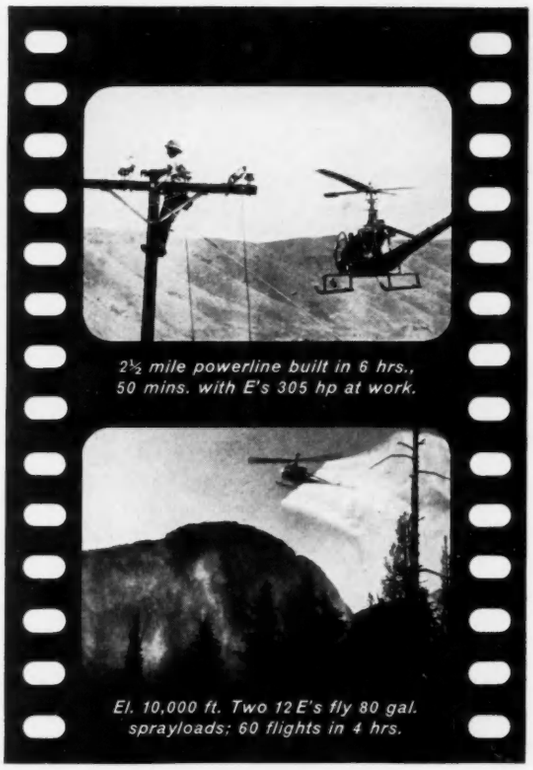
Hiller 12 E sets aviation record, lands and picks up payload at 18,000 ft.

12 E, first light copter to erect entire powerline; 40′ poles, el. 5,000 ft.

34,500 lbs. of machinery to exploration mine in 8 hrs. mountain flying.

Microwave station on 4,000′ ridge; all 8 tons material; 2 days flying.

You are invited to write for full details.



2½ mile powerline built in 6 hrs., 50 mins. with E's 305 hp at work.

El. 10,000 ft. Two 12 E's fly 80 gal. sprayloads; 60 flights in 4 hrs.

THE BIG PERFORMANCE PICTURE

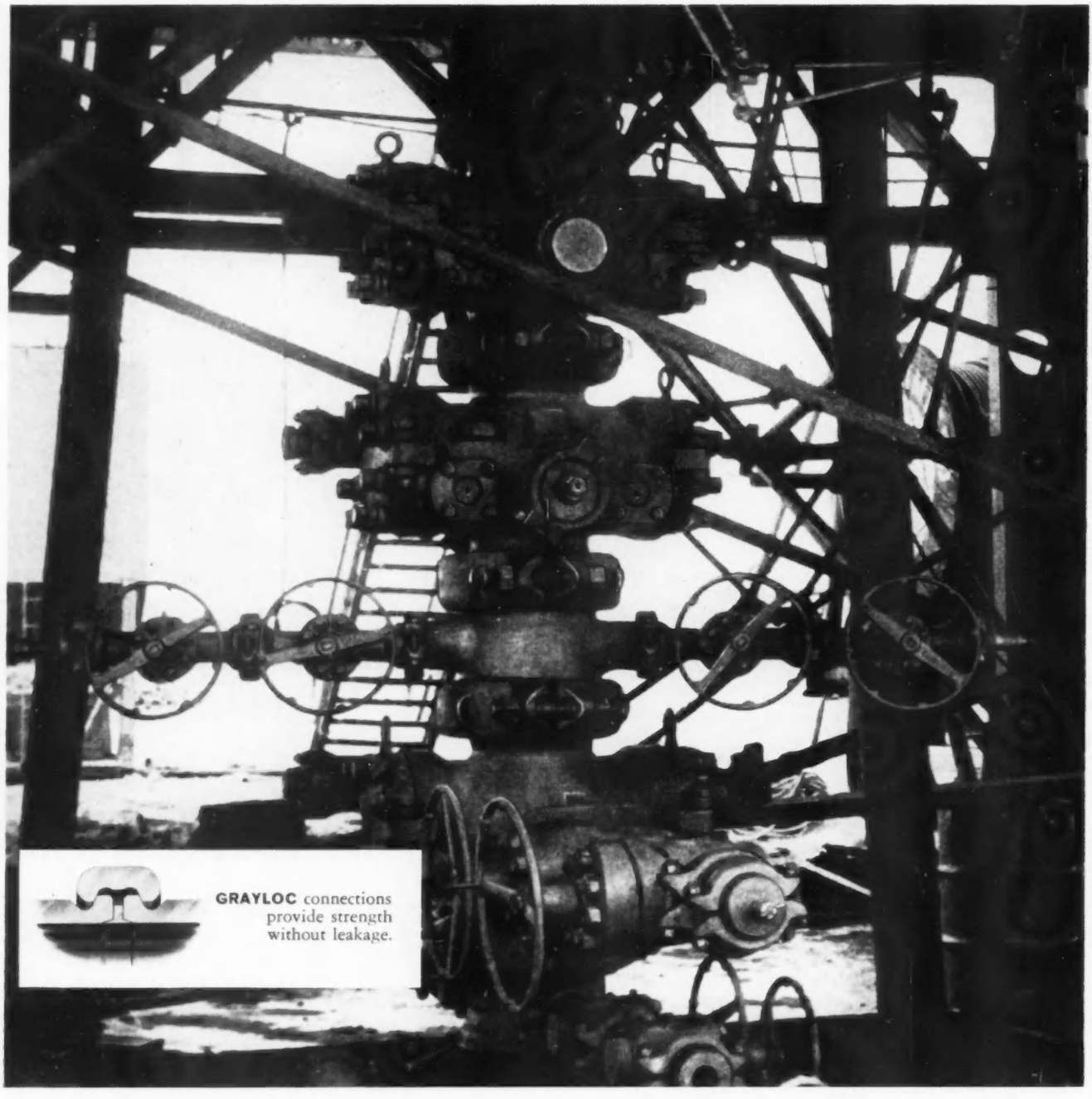
Why fleet operators—men whose business depends upon safe, powerful helicopters—have made Hiller 12 E's their No. One buy

From the day it went into commercial service, the Hiller 12 E rewrote the specs on what light helicopters can do. With an Army-proved airframe and drive system that hadn't begun to use its full strength, the 12 E was able to harness the full power, full time, of its bulldozer-size 305 hp engine. Flying more payload or passengers faster is one result. Safety is another. This margin of power makes landings and takeoffs in mountain canyons in the heat of summer, routine.

Both the Hiller 12 E and its new 4-place sister ship, the E4, are powered to get the job done faster and more economically. It's features like these—power, safety, economy—that in less than two years have made the 12 E the No. One buy of helicopter fleet operators throughout the world.

Write for brochure, "Here Comes the Hiller E4", and for "New Workhorse for Petroleum", booklet which gives full information on the 12 E, and Hiller charter operators' trip or contract services everywhere. Address Commercial Division

HILLER AIRCRAFT CORPORATION



GRAYLOC on Well Head and Control Equipment Safely Withstood 7,300 PSI

This all Grayloc assembly, in use on a well in Eastern Venezuela, withstood well pressures of 7,300 psi during drilling operations — proving that Grayloc equipped assemblies provide the greatest possible blow-out protection. The assembly required no additional tightening after the original make-up.

It took a native crew less than six hours to nipple-up this Grayloc equipped well head and control assembly, and it required approximately 24 inches less substructure height than a comparable flanged hook-up.

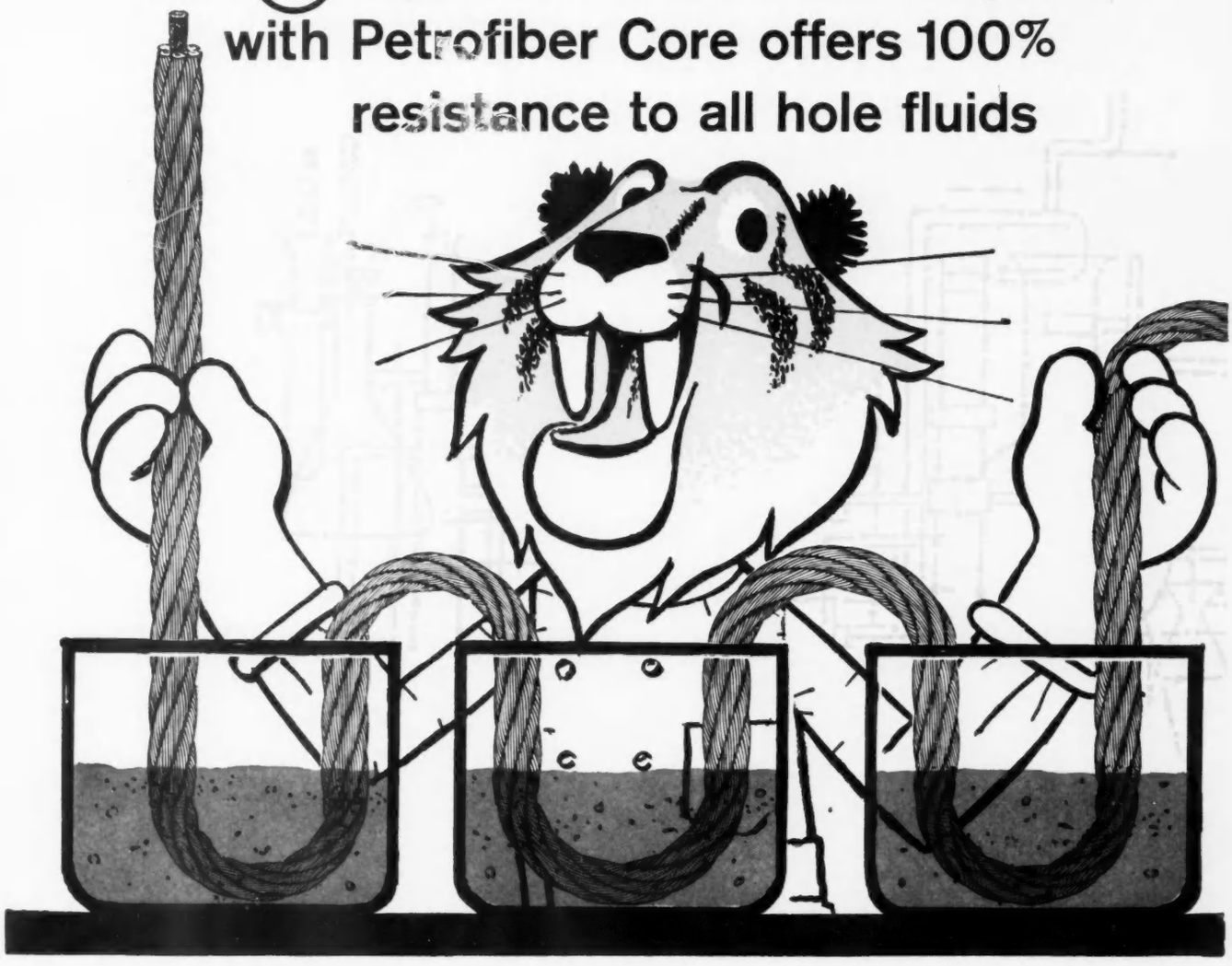
Learn how Grayloc connections can save you extra hours and money on control systems with complete blow-out protection.

Write for the new Gray Catalog *today.*

GRAY *Tool Company*

6002 P. O. Box 2291 Houston 1, Texas RIverside 7-1240

New USS Tiger Brand well-servicing line with Petrofiber Core offers 100% resistance to all hole fluids



Petroleum has come back to serve the well-drilling and servicing industry. The Petrofiber core of this improved line is made of synthetic fibers which are derived from a new group of petrochemicals, polypropylene by name. This material has superior qualities for cores of swabbing lines, sand lines, coring lines and cable-tool drilling lines.

100% resistance to all hole fluids. Since Petrofiber cores are 100% resistant to all hole fluids, the operator running the new Tiger Brand line has no worries of core washout or erosion throughout his line's service life. Such a line can be stored indefinitely anywhere without rotting or aging of the core because Petrofiber has no tendency to absorb hole fluids or chemicals. It even resists caustic soda.

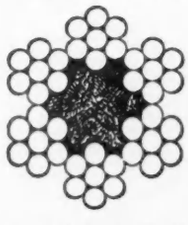
A more stable line throughout its life. Petrofiber cores, being of the "fiber" type, afford more stable and more lasting support to a line's steel strands. They maintain a uniform diameter and core flow generally associated with solid plastic core lines is eliminated.

Withstands highest well temperatures—or Arctic cold. A prime advantage of Petrofiber cores is their high softening point of almost 300° F. This permits operation at well temperatures higher than is possible with any other swabbing line. Since they also retain full toughness down to minus 80°F., these lines could be used at the Arctic Circle without damage to the Petrofiber core.

Lower costs—longer life. Thorough testing in the laboratory of American Steel & Wire, plus operation in the field, have proved the new Tiger Brand lines with Petrofiber cores result in lowest cost well servicing. No other swabbing line has ever offered so many advantages engineered to meet every hard usage requirement.

Send for our complete booklet on USS Tiger Brand Wire Lines with Petrofiber Cores. Write American Steel & Wire, Dept. 0437, 614 Superior Ave., N.W., Cleveland 13, Ohio. *USS, Tiger Brand and Petrofiber are trademarks*

USS Tiger Brand well-servicing lines with Petrofiber cores are made in standard constructions, 6 x 7 and 6 x 19, in all regular sizes. Order from your local Tiger Brand Wire Line distributor.



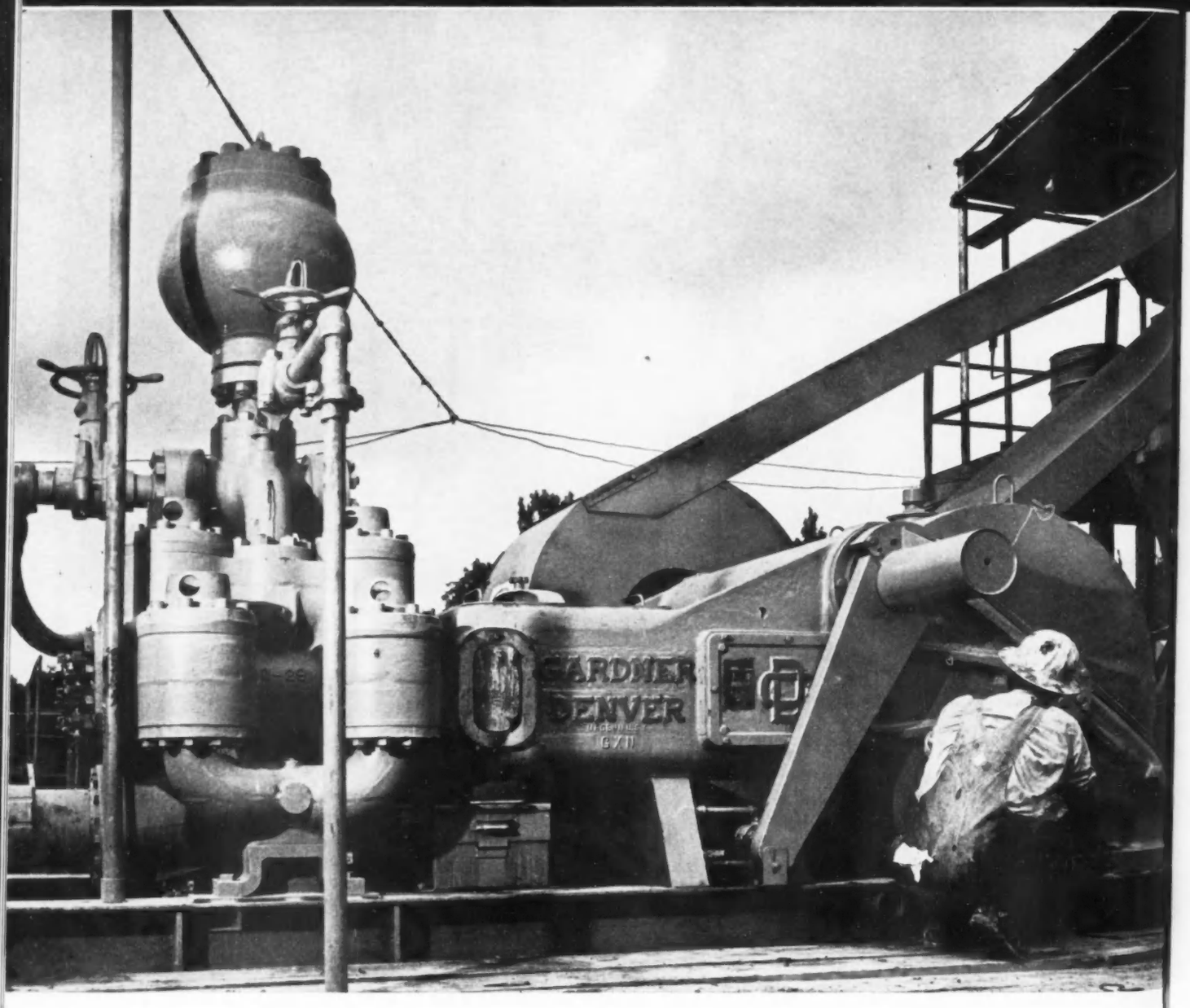
This mark tells you a product is made of modern, dependable Steel

American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, Distributors Abroad

Gardner-Denver Mud Pump parts are easily replaced at the rig site. J&L Supply stores in the United States and Canada stock the parts. This is how to.....

Simplify



This GXN is one of two Gardner-Denver mud pumps in tandem arrangement on a wildcat in Louisiana. Gardner-Denver engineers designed these pumps for complete service in the field. And Gardner-Denver mud pump parts are as near as your J&L Supply store. Unitized, trailer-mounted, offshore—any rig with Gardner-Denver mud pumps is never handicapped for lack of experienced Gardner-Denver service or genuine Gardner-Denver parts.

Mud Pump Maintenance

SAFEGUARD AGAINST RIG BREAKDOWN.

There is a difference in valve cap studs. Gardner-Denver studs are machined from alloy steel and heat treated.

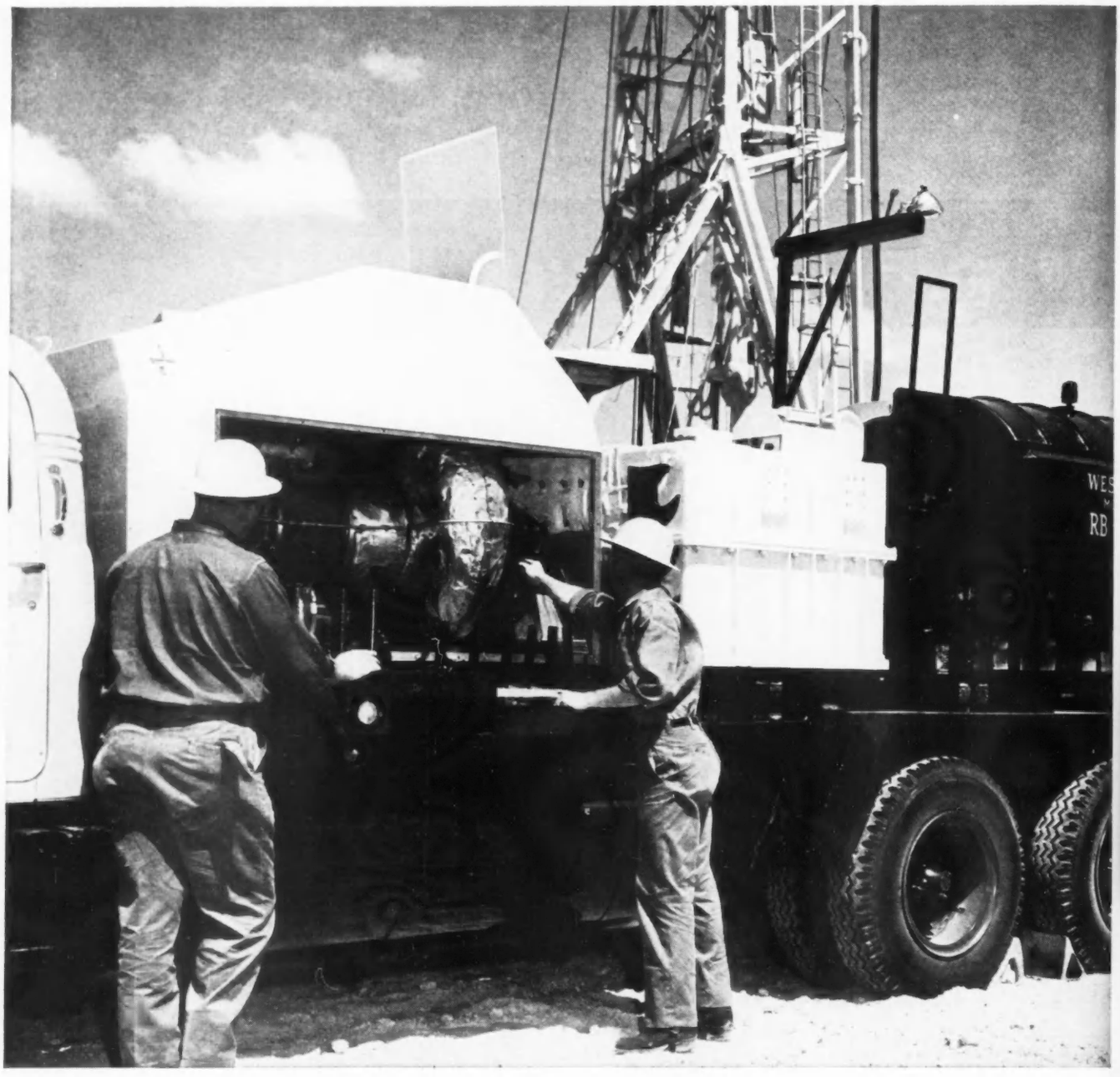
To avoid costly failures, damaged equipment, insist on genuine Gardner-Denver parts. Protect your investment in quality.

Ask your J&L Supply man for literature on Gardner-Denver mud pumps in sizes to 1250 h.p. for drilling to any depths.

Jones & Laughlin

SUPPLY DIVISION – Tulsa

If it's sold by J&L....It's the best available



Solar gas turbine stimulates production of oil and gas wells

OIL FRACTURING OPERATIONS — used to stimulate production of oil and gas wells — must take place at the well site. This means that fracturing and acidizing pumping units must be lightweight and mobile — yet provide in excess of 1000 hydraulic horsepower for most operations.

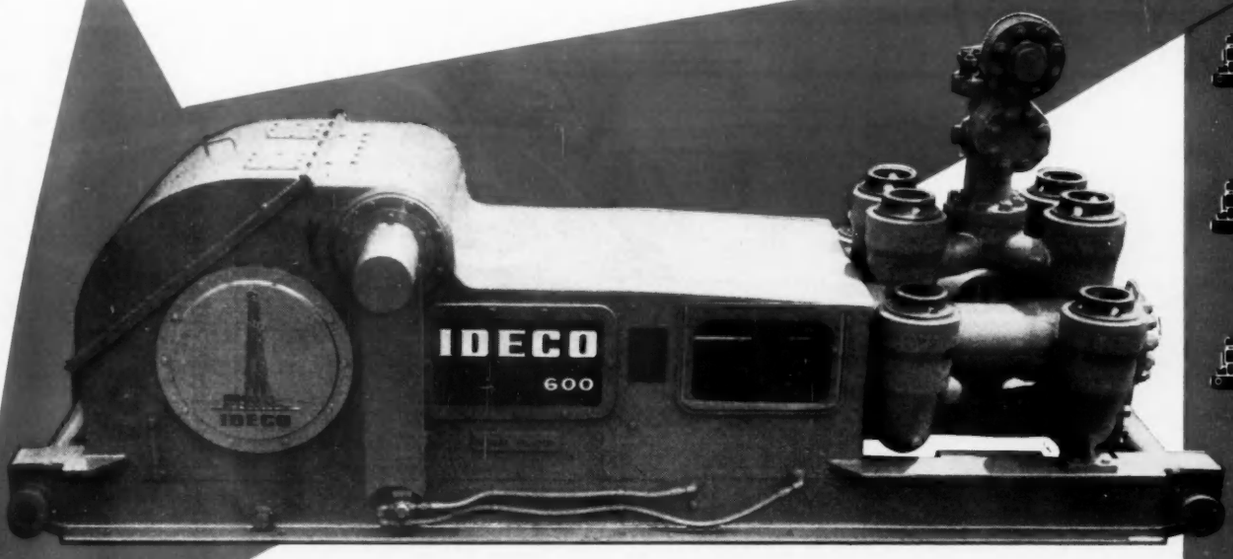
The Western Company's new 1000 hydraulic horsepower fracturing pump is powered by Solar's *Saturn* T-1000 gas turbine engine. Up to 1250 hp is required to drive the pump in this application. Weight of the truck and turbine-driven fracturing unit is significantly less than 500 hp diesel units currently used by Western. The *Saturn* T-1000 turbine-powered pump delivers twice the hydraulic hp of the diesel units — reducing by 50% the number of units needed per operation.

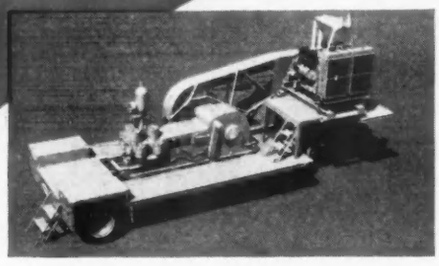
The *Saturn* T-1000 engine weighs only 1200 lbs and occupies less than 51 cubic feet. It is simple in design, starts instantly from —65 degrees F to 130 degrees F, and takes full load in seconds without warmup. It has been engineered for simplicity of operation and long life under industrial conditions. As a compact and reliable power source for generators, compressors, pumps, and other oilfield equipment... investigate the *Saturn* T-1000 gas turbine. There's a Solar gas turbine for almost every application in the 50 to 1250 hp field. Write for particulars to Dept. H-182, Solar Aircraft Company, San Diego, California.

SOLAR
AIRCRAFT COMPANY
A subsidiary of International Harvester Company

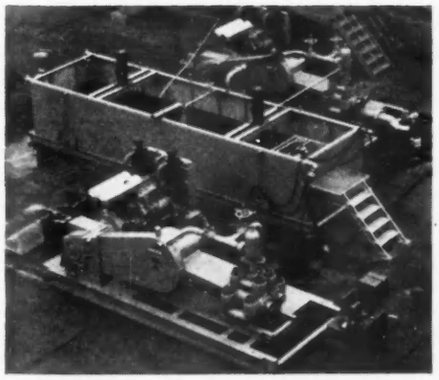
CHECK THESE *12 All-steel*

IDECO MUD PUMPS





One of 12 trailer-mounted MM-200 pumps for one customer.



Two MM-300 pumps being assembled for testing.

Power pumps that deliver a high pressure punch — Ideco builds them in twelve sizes, duplex and triplex, from 200 to 1250 H.P.

These all-steel pumps feature precision-built power ends and streamlined one-piece fluid ends which work together as a tough team to help you show more profit in today's competitive market.

Ideco pumps are a product of the application of years of engineering experience by men who really know pumps. Fabricated all-steel design assures minimum vibration . . . heat treated pinion shaft and Falk herringbone main gear can be reversed for double life . . . double-row Timken tapered roller bearings assure durability. Threaded valve pot covers speed valve servicing and reduce crew work. Gamma ray and strain gauge tests prove the strength of every part.

So remember, when you think of mud pumps . . . think of Ideco — you'll get the best. Just ask the men who have been using them.

There is no Substitute for Quality

T-440-C

FM-600

T-880-C

FM-1000

FM-1250

MM-200

MM-300

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MM-600

MM-700

MM-1000

MM-1250

IDECO P. O. BOX 1331 DALLAS, TEXAS

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GO.... *All the way with* GULFCO!

No matter what your completion requirements, there's quality controlled, forged steel Gulfco well head equipment that will go all the way: from Zero to 15,000 pounds psi working pressure. Gulfco has it, from immediate stock. And . . . Gulfco **SERVICE** goes all the way too.

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GULF COAST MACHINE & SUPPLY COMPANY

DRILLING BRIEFS

WELL CEMENTING DATA REPORT 60-5

Long Interval Squeeze Jobs... an old DIACEL* story.

The recent "something new" talk in industry journals about long interval squeeze cementing with low water loss slurries surprises us somewhat. Especially . . . since our Diacel LWL Cement Systems have been acclaimed for over two years in technical papers, ads, and in the field for efficient squeezing. Just for the record, our Diacel LWL additive was introduced some five years ago for regular cementing jobs . . . specially developed for deep, high temperature wells. Its use for squeeze jobs was a natural consequence of the low water loss and thickening time control provided.

With Diacel LWL, the success of squeeze jobs is almost certain. Slurries are easily formulated with weights from 10.3 to 20 pounds per gallon for a wide range of thickening times. With Diacel LWL, dehydration is practically a thing of the past . . . and the slurry in the casing can normally be reversed or washed out.

First Diacel LWL Squeeze in Western Kansas.

Our early experience and success with long interval squeezes in both deep and shallow wells at all temperatures convinced us that Diacel LWL would be just the thing for Western Kansas fields. The fractured limestone formations in Western Kansas are difficult to seal off, especially if they have been acidized. Squeezing was usually a costly procedure until Diacel LWL slurries were adopted. In looking back through the files, we uncovered the data on the first Diacel LWL squeeze in the area. It was done in Sherman County, Kansas, in the spring of 1958 . . . and, while not as spectacular as some more recent jobs, it did establish our LWL slurries for squeeze cementing in the area.

128 Perforations Over a 249-foot Interval.

This particular well had been drilled to 4958 feet and a seven-inch casing set at 4956 feet with a 20% Diacel D cement using 105 sacks of common and 200 pounds of calcium chloride. Testing was done in seven stages, with a total of 128 perforations being made over a 249-foot interval—from 4459 to 4708 feet in the Lansing Kansas City and Marmaton fractured limestone formations. Six of the perforated intervals were acidized. When the tests proved unproductive, it was decided to convert the well for salt water disposal in the Mississippi formation. In addition, an unprecedented attempt would be made to seal off the entire 249-foot perforation interval in one squeeze with a Diacel LWL slurry. At that time the accepted practice with conventional slurries called for one to two squeezes for each of the seven perforation stages.

Just One Day Needed!

After testing, all bridging plugs were drilled out to 4912 feet and a retrievable packer on 2½-inch tubing was set at 4423 feet. Fluid pressure to the packer was established at 1000 psi. A 15 lbs./gal. slurry was then mixed using 300 sacks of common, 0.3% Diacel LWL and 3% Diacel A (an accelerator). Cement was pumped in stages for 6 hours and 40 minutes before squeeze pressure of 3300 psi was reached.

Saved Two Weeks Rig Time.

After reversing out 11 sacks of slurry and retrieving the packer, the bit was lowered and washed down to 4892 feet. The hole tested dry . . . and the well was deepened through the bottom cement plug into the Mississippi formation at 5003 feet.

In all, squeezing off the perforations and washing down took about a day. Under the old method approximately 10 to 15 separate squeezes would have been required. Conservatively, two weeks rig time was saved by using the low water loss Diacel LWL slurry. As we said before, long interval squeeze jobs are "old stuff" for us.

For complete details and technical data on cost-cutting Diacel Cement Systems for every type of job and well—contact us or your Drilling Specialties representative. *A trademark

DRILLING SPECIALTIES COMPANY
Bartlesville, Oklahoma

Modern steels to meet the needs of tomorrow

ALLOY STEELS—OPEN HEARTH AND ELECTRIC FURNACE

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Boiler Tubes, Superheater Tubes, Still Tubes, Condenser and Heat Exchanger Tubes
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AMERTEL* Telephone and Telegraph Wire
AMERICAN* Fence
CYCLONE* Fence
DIAMOND* Fence
ELLWOOD* Fence
Fence Posts and Gates
AMERICAN SCOUT* Barbed Wire
GLIDDEN* Barbed Wire
IOWA* Barbed Wire
RANGER* Barbed Wire
WAUKEGAN* Barbed Wire
CYCLONE* Conveyor Belts
CYCLONE* Fiberglas Screening
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TIGER BRAND* Electrical Wires and Cables
TIGER BRAND* Wire Rope
TIGERWELD* Rail and Signal Bonds
PREMIER* Spring and Welding Wire
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United States Steel Export Company

USS

*Trademarks

CARRY YOUR WELL SWABBING "RIG" UNDER YOUR ARM!

Swabbing is accomplished by dropping SWABSTIX Flow Inducers (each 1⅛" in diameter and 24" long, packaged six to a carton) down the well tubing.

New Swabstix *Flow Inducers*

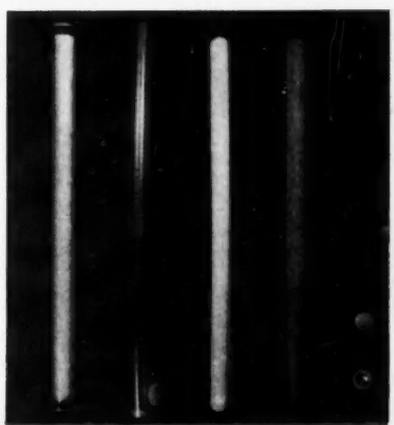
SWABSTIX* Flow Inducers, unique new products developed through Tretolite research, now make it possible to restore oil flow in fluid-logged wells through *chemical* swabbing. Remarkably easy to transport and use, they offer obvious advantages over conventional mechanical rigs, particularly when wells are difficult to reach, such as in offshore or bayou locations.

Enough SWABSTIX Flow Inducers for a complete well treatment can be carried anywhere by one man. Swabbing requires no additional help, no special tools or equipment. No other method is as fast and convenient.

Each SWABSTIX Flow Inducer unit consists of a water-soluble, oil-insoluble plastic cylinder filled with a powdered chemical. The cylinder is dropped down the fluid-logged well tubing and remains intact while traveling through the oil column. Upon reaching the water phase, the stick dissolves. The released chemical rapidly generates gas by reaction with water. This gas increases in volume and reduces the density of the well fluids. As the gas expands and moves toward the surface where pressures are lower, flow is induced.

Ask the Man in the Red Car *to explain more about the use of this new Tretolite product, or write for the* SWABSTIX *brochure just published.*

*Trademark of Petrolite Corporation



SWABSTIX Flow Inducer components are (from left): unit package, outer polypropylene tube and caps, chemical unit, water-soluble tube and end caps.

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85-60-2

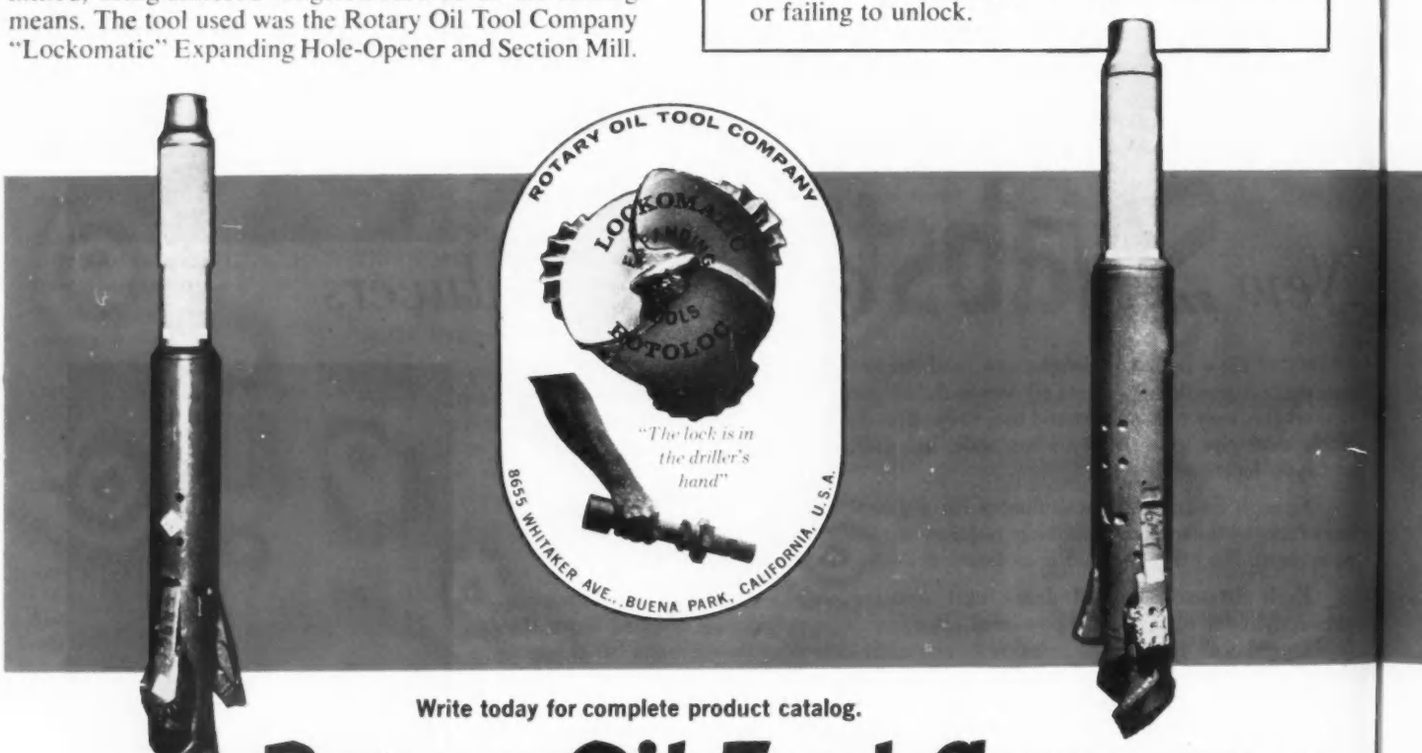
Why a Rotary "Lockomatic"
HOLE-OPENER AND SECTION MILL?

Until 1947, under-reaming a rotary drilled hole was uncertain and hazardous, due to the lack of satisfactory tool designing.

In 1947, Rotary Oil Tool Company designed and developed the only positive locking and positive unlocking expanding Hole-Opener (under-reamer), using roller cutters. Through use and experience, this tool was constantly improved and redesigned until, in 1954, the hydraulic-powered "Lockomatic" Hole-Opener was developed. It was immediately recognized that this hydraulic-powered "Lockomatic" Hole-Opener could and should be used to cut through casing and then drill up the casing. In September, 1954, the first casing was milled, using sintered tungsten carbide as the cutting means. The tool used was the Rotary Oil Tool Company "Lockomatic" Expanding Hole-Opener and Section Mill.

California records show that from September, 1954, to December 31, 1959, Rotary Oil Tool Company Lockomatic Hole-Opener and Section Mill milled 8536 feet of casing of various sizes, grades and weights. Statistics from other areas are not available. The rate of penetration has been constantly improved from one to three feet per hour at the start of this operation to our present penetration rate of one to eight feet per hour.

Rotary Oil Tool Company Lockomatic Hole-Opener and Section Mill has never been stuck in a hole due to cuttings fouling the mechanism or failing to unlock.



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Rotary Oil Tool Company

Serving the industry over 20 years

8655 Whitaker Avenue, Buena Park, California
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TOOLS AND SERVICE WITHIN 24 HOURS

Tools and service within 24 hours to any point in the United States or Canada.

Call collect person-to-person Rotary Service Desk, LAmbert 6-4621, Fullerton, California or wire collect Rotoiltool.

Service charges begin at your nearest airport. Rotary Oil Tool Company pays freight and transportation to and from your nearest airport.

This revolutionary method of tool service assures immediate availability of all tool sizes, Rotary Oil Tool Company trained service personnel and tool maintenance at factory standards.

Export prices and information may be obtained by writing Rotary Oil Tool Company, 8655 Whitaker Ave., Buena Park, California or by cabling ROTOILTOOL.

Why a Burns Liner Hanger?

With the advent of seamless alloy casing, drill pipe protectors, roller bearing bits, weight indicators, greater table speeds and other improvements in drilling practices, came a period of development of the liner hanger. Full oil strings from the top to the bottom of the well were abolished as needless expense and a wasteful practice.

It remained for the Burns Tool Company to develop the first truly scientific, safe, dependable liner hanger. One that was positive in setting and releasing action, that would stay where it was set, and that could easily be retrieved.

The Secret of Positive Dependability of the Burns Liner Hangers 100% slip contact—The entire area of each slip contacts the casing, guaranteeing a secure, solid grip.

100% slip support—The entire area of each slip is completely supported by the strength of the hanger body itself. This is a guarantee against slip breakage and promotes the efficiency of the liner hanger.

The secret of positive dependable hanger operation lies behind the slips. The Burns safety hangers are the only ones that are scientifically designed to provide perfect concentricity—100% slip contact—between the slip and the slip recess in the hanger body throughout the entire length of slip travel. The cut-away view below illustrates the slip and slip recess construction. Note that the slip actually receives the full support of the hanger body at all times, the "bridged" construction of the slip assembly. Not only is each slip completely supported by the hanger body, but also the sides of the slips are supported and guided by grooves in the slip recess. Construction of this type assures absolute dependability—support from the hanger body guarantees perfect slip contact with the casing at all times. Efficiency plus safety.

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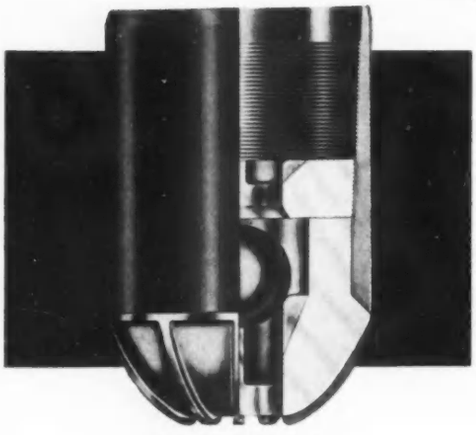

RECTOR TYPE "A" FLOAT SHOE

Precision machined from seamless steel tubing. Internal parts are high-strength, drillable aluminum alloy. Moulded rubber-covered float ball insures positive seating.

DRILLABLE ALUMINUM NOSE MAKES RECTOR TYPE "A" CEMENTING EQUIPMENT A WINNER EVERY TIME

The ribbed aluminum guide nose on RECTOR'S Type "A" float shoe is your best bet for getting pipe safely "on bottom" every time. Made from a special aluminum alloy, developed by RECTOR, it provides far greater impact, compression, tensile and shear strength than either concrete or bakelite. RECTOR'S aluminum guide nose guides the cementing shoe past ledges, bridges and other obstructions without danger of breaking. On completion, the aluminum alloy can be drilled out easily, and because there is less material to drill out, it drills out faster.

This superior feature is yours at no extra cost . . . So, for dependability, and exacting performance in all cementing operations, put your money on a sure winner. Specify RECTOR Type "A" cementing equipment from your favorite supply store or see your RECTOR representative.

30 YEARS MAKING THE OIL INDUSTRY SAFER

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Making the Oil Industry Safer!

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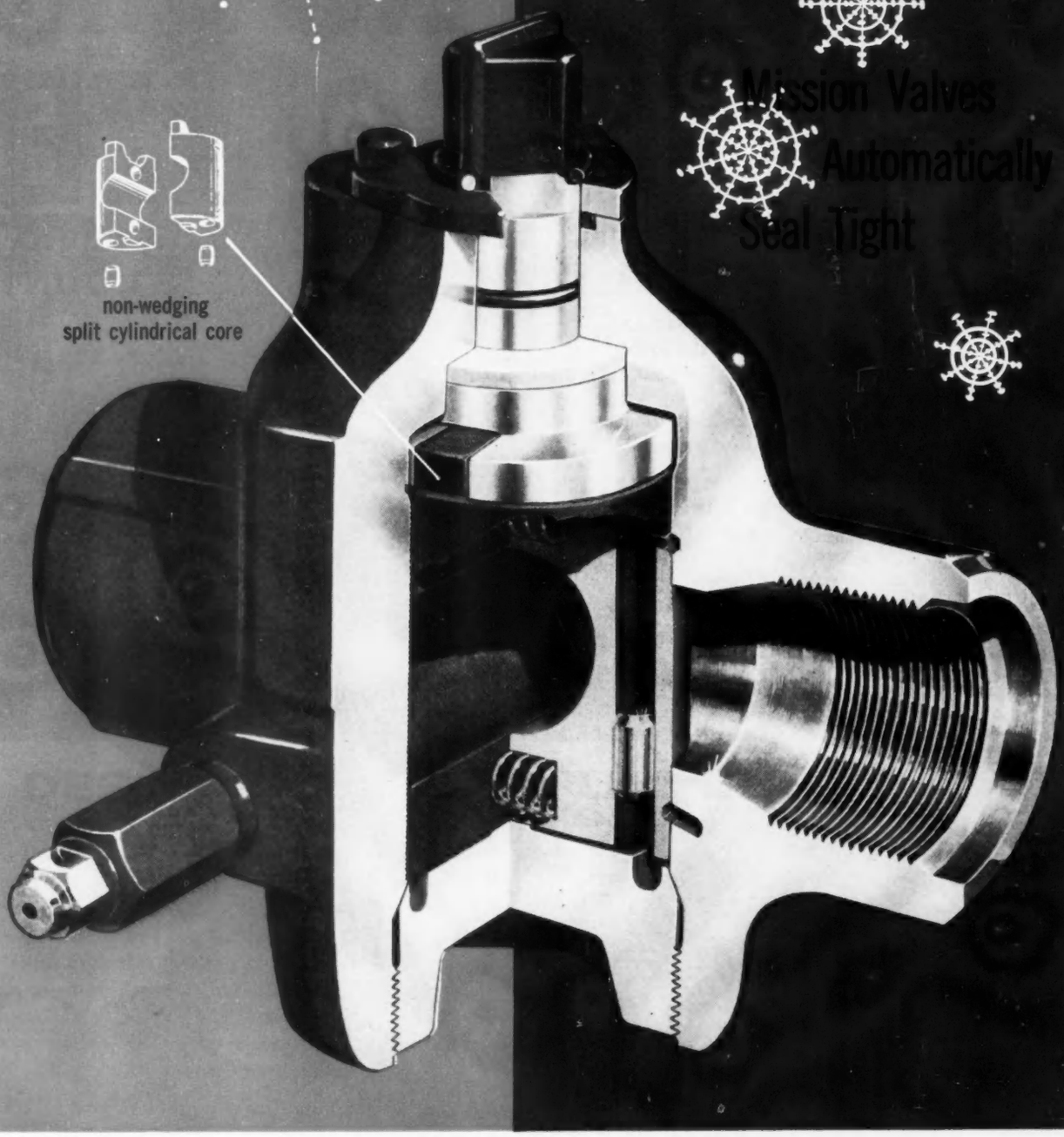
HOT or COLD

Mission Valves Automatically Seal Tight

non-wedging
split cylindrical core



No Thermal Distortion. Here's why: A non-wedging, split cylindrical core seals without wedging. Only the downstream core half is pressed against the body by line pressure. It literally "floats" into position to compensate for thermal or physical distortion. The upstream core half is held lightly against the body only by spring pressure. The circular sealant groove is positioned at the heaviest section in the valve body thereby eliminating distortion and effecting a perfect seal in this critical area. Sealant is forced automatically — by line pressure itself — through two semi-circular grooves around the downstream port. Leaks are literally stopped before they begin.

Mission features a full hole, round opening valve with no restrictions, no turbulence. Regular round opening valves are also available. The wide selection of more than 315 valves to choose from, the Mission guarantee, and the Mission Valve Renewal Policy combine to make Mission your best and most economical buy.

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FOR DRILL COLLARS

FOR DRILLING BIG HOLES IN CROOKED HOLE COUNTRY

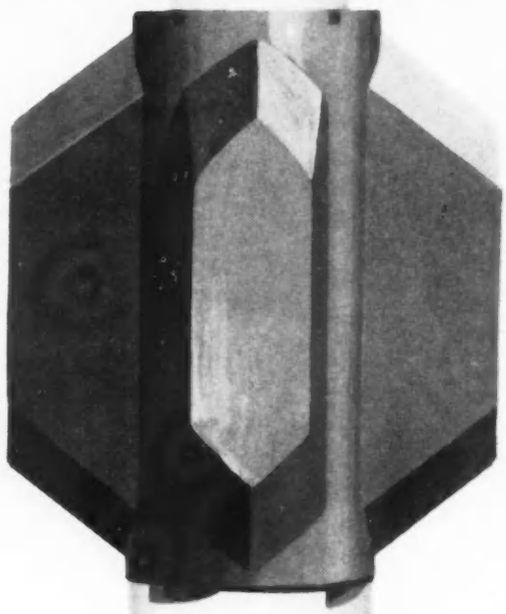
Drilco—the pioneer developer of engineered tools for straight hole drilling—now brings to the industry the 4-Rib Rubber Stabilizer for 17-½", 15", 13-¾" and 12-¼" holes.

It's the most advanced tool on the market today for drilling straight holes in crooked hole country.

The new design . . .

- Provides larger circulation passages between rubber ribs to permit large rocks and cuttings to pass by stabilizer sleeve.
- Reduces drill collar connection failures.
- Prevents excessive "buckling" of drill collars in large diameter holes.

For superior performance specify Drilco stabilizers for drilling straighter holes in crooked hole country–there is a Drilco stabilizer for every hole size.



Write for your free copy of "Drilling Straight Holes in Crooked Hole Country." New comprehensive tables showing • Effect of drill collar size • Correct stabilizer placement for drilling straighter holes.

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Drawer 3135 Midland, Texas

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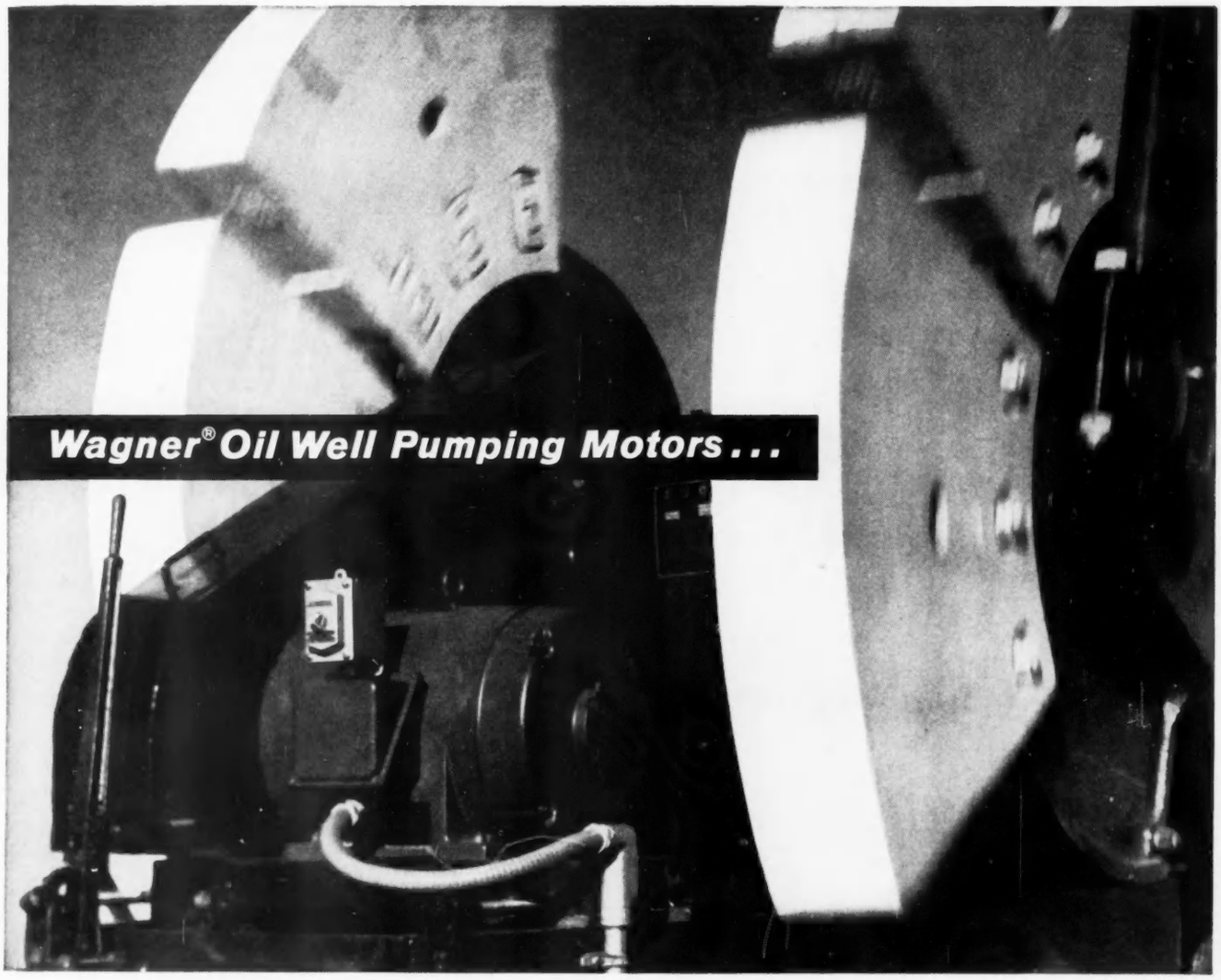
FE 2-2041
Midland
MU 2-5238

WYOMING
Casper
23-47139



DESIGNED TO CUT PUMPING COSTS

Positively. For Wagner® Class B insulated Type DP-6 Motors are engineered for oil well pumping, *and only oil well pumping.* Nothing else. Because they are designed with high torque and high slip for this specific job, these motors consume fewer kilowatts per barrel pumped . . . give you double dollar savings (in initial investment and in operating costs) without sacrificing efficiency and dependability.

Consider this: built in ratings of 5 hp and larger, these high torque motors handle heavy initial loads smoothly and without laboring or stalling. Their high slip feature lets them slow down at peak load so the flywheel of the pump can deliver part of its stored energy to the load. Motor windings are protected by advanced Class B insulation which provides ample thermal capacity to absorb heat resulting from peaks of the cyclic load. Completely dripproof enclosures protect them against rain, sand, sleet and snow. Rugged cast iron frames and endplates bar corrosion. Conduit boxes are moisture-proof and dust-tight, and ventilating openings are screened to keep out animals and wind-blown debris. You pump *better* electrically with Wagner Motors.

Your Wagner field engineer can give you the complete story, and help you plan oil well pumping, gathering and water-flooding systems . . . assist you in solving your electrical problems. Call him now, or write for Bulletins MU-243 and MU-246.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Wagner Electric Corporation

6457 PLYMOUTH AVENUE • ST. LOUIS 33, MISSOURI

WM60-22

SERVING 2 GREAT GROWTH INDUSTRIES—*ELECTRICAL • AUTOMOTIVE*

REED

THIS IS THE QUALITY LINE

WHEN YOU RUN REED you know that the product is reliable. Every Reed product you use bears the Reed "Mark of Quality." This means that rigid quality control procedures have inspected and tested it all the way through the manufacturing process.

WHEN YOU RUN REED you know that you are using equipment that embodies the most advanced engineering principles. Reed leads the way in tool joint, rock bit, and drill collar design — engineering advances that mean the Reed products will wear longer and perform better.

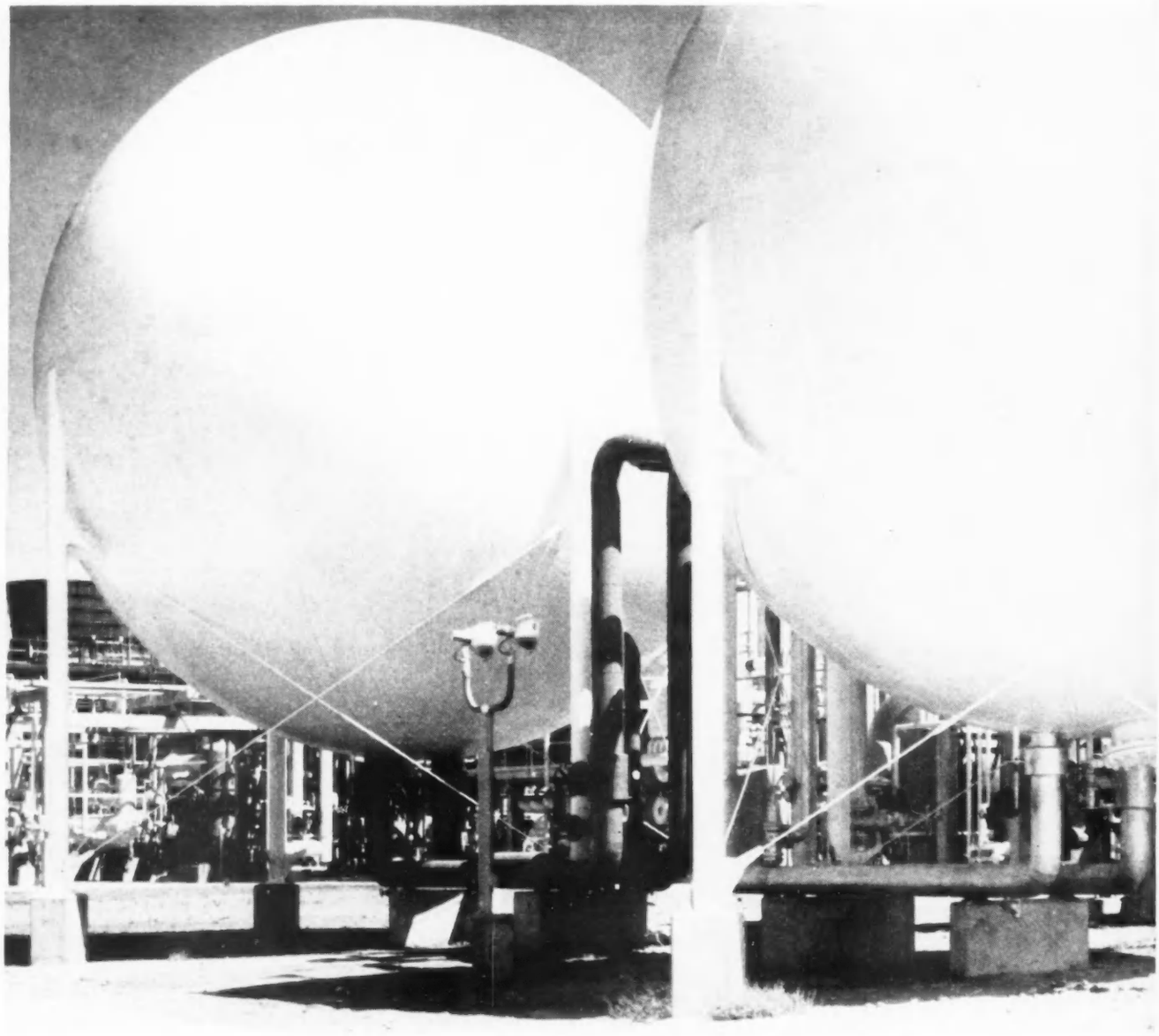
WHEN YOU RUN REED you get service that can't be matched in the oil fields. The Reed man is at your service 24 hours a day — and he likes to give you the service that keeps you happy and makes you money.

RUN THE QUALITY LINE on your next well — Reed Tool Joints, Reed Rock Bits, Reed Drill Collars — you'll be glad you did. Call the Reed man near you for the full story.

REED ROLLER BIT COMPANY • Houston 1, Texas

EXPORT OFFICE: TIME and LIFE BLDG., SUITE 3744 ROCKEFELLER CENTER, NEW YORK 20, N.Y.

GULF COAST, MID-CONTINENT AND ROCKY MOUNTAIN DISTRIBUTOR FOR MARTIN-DECKER PRODUCTS



For high-pressure problems,

Graverspheres® are the answer

For the pressure storage of process butane, iso-butane, natural gasoline and other volatile liquids and gases, Graverspheres, developed by Graver Tank & Mfg. Co., East Chicago, Indiana, U.S.A., are the answer.

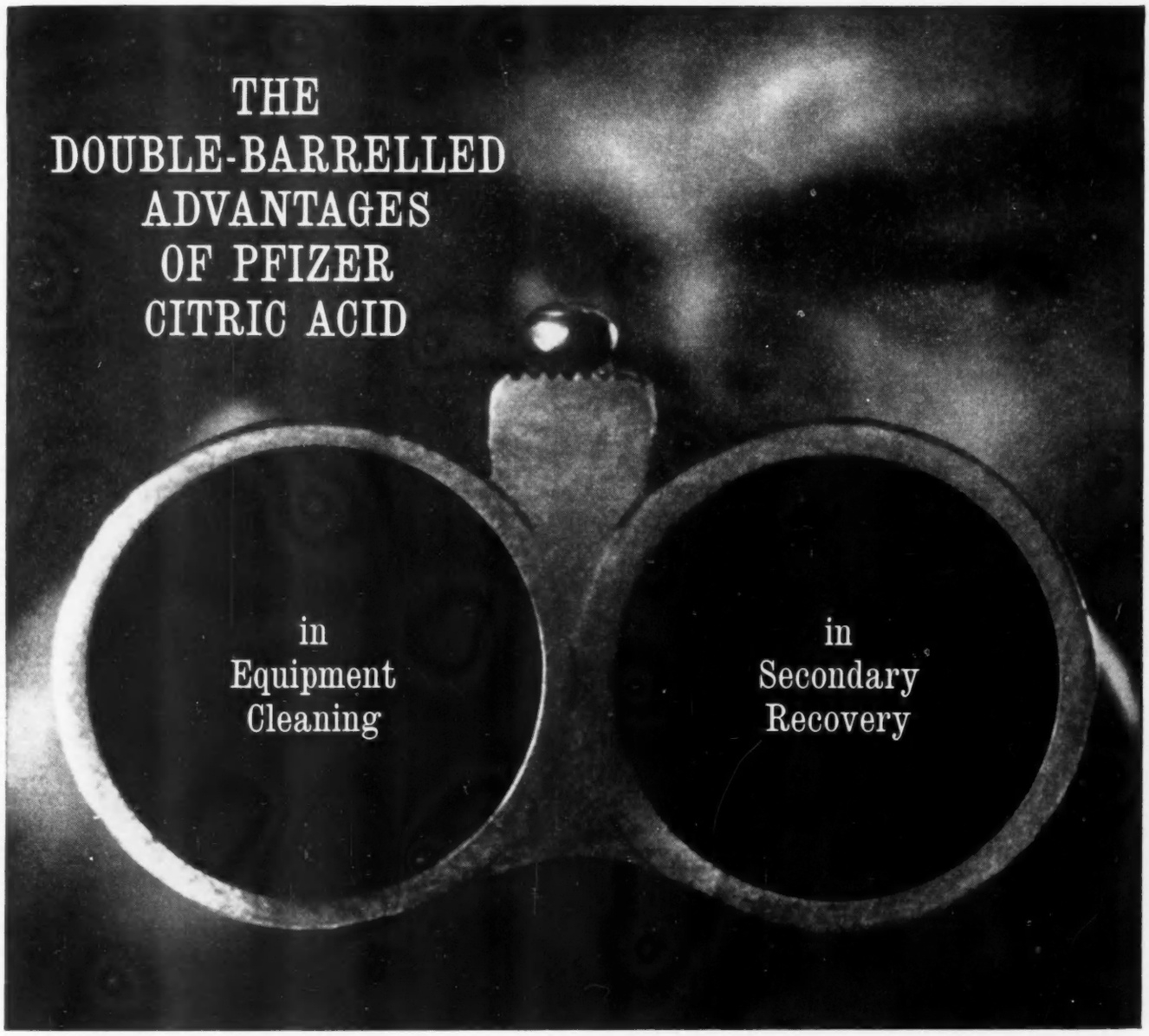
Graverspheres offer large capacity (1,000 to 45,000 bbl.), require less ground space and piping . . . fewer fittings.

Precisely formed in Mechans' shop, Graverspheres are then shipped to location, erected, and field X-rayed.

If you have a gas or liquid storage problem, Mechans-engineered . . . Mechans-built Graverspheres may be your answer. May we quote you on your requirements?

MECHANS LIMITED

HEAD OFFICE AND WORKS: GLASGOW W. 4
LONDON OFFICE: 129. KINGSWAY, LONDON, W.C. 2



●● Pfizer Citric Acid today is rapidly becoming a more useful product for the petroleum industry. Not only is it an excellent chemical cleaning agent for petroleum refining equipment, but its long established use in secondary oil recovery continues to grow.

In cleaning petroleum refining equipment, citric acid effectively dissolves scale and corrosion deposits. Citric acid also prevents the reprecipitation of dissolved scale. It will not cause chloride stress corrosion cracking. Consult your chemical cleaning service company regarding these and other advantages of cleaning equipment with Pfizer Citric Acid.

●● In secondary oil recovery, Pfizer Citric Acid prevents sandface plugging caused by iron in the injection water. The results:

- higher injection rates
- lower injection pressures
- less frequent downtime on filters
- less replacement of parts due to rusting
- reduced frequency of costly acidizing or fracturing operations

Pfizer Citric Acid sequesters iron more efficiently and economically than any other chemical. It is non-toxic, water soluble and easily handled.

Pfizer

Manufacturing Chemists for over 100 Years

Science for the world's well-being

CHAS. PFIZER & CO., INC., CHEMICAL SALES DIVISION

630 Flushing Ave., Brooklyn 6, N.Y.

Branch Offices: Clifton, N.J.; Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Tex.; Montreal, Can.

Write Pfizer for details on the use of citric acid in chemical cleaning or in water flooding applications.

I want to learn more about the use of Pfizer Citric Acid for chemical cleaning and in secondary oil recovery.

Please send me:

☐ Technical Bulletin 102: "Pfizer Products for Chemical Cleaning"

☐ Technical Bulletin 97: "Pfizer Products for Petroleum Production"

WO

Name_____

Company_____

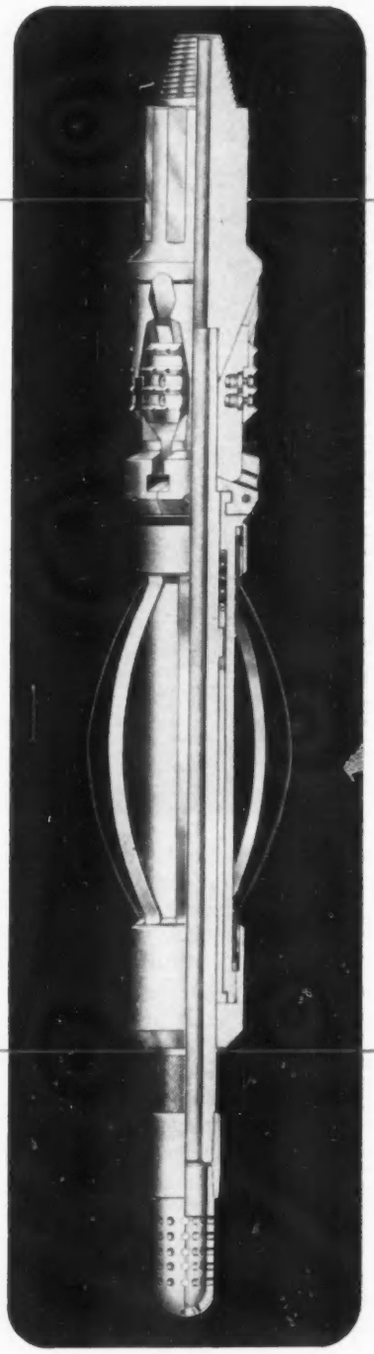
Address_____

City_____ Zone___ State____

HALLIBURTON

SIDE WALL ANCHOR ASSEMBLY

eliminates need for anchor pipe to bottom



Halliburton's Side Wall Anchor Assembly, set below straddle packer assembly in open hole, is designed to:

- Provide support for mechanical weight required to set packers and open tester valve.
- Permit positive isolation of a zone, regardless of distance from bottom of hole.
- Eliminate rig time required for making up and breaking out long anchor pipe.
- Reduce possibility of sticking.

REDUCE RIG TIME with the Side Wall Anchor:

IN CONVENTIONAL TESTING — Used with an equalizing tube for selected single zone testing, round trips are eliminated in the event packer does not seat . . . it can be repositioned for resetting.

IN MULTIPLE ZONE TESTING — Used with the *new* Halliburton Multiple Zone Wireline Sampler, it is possible to take several samples and pressure recordings from the same formation or from different formations *without round tripping the string.*

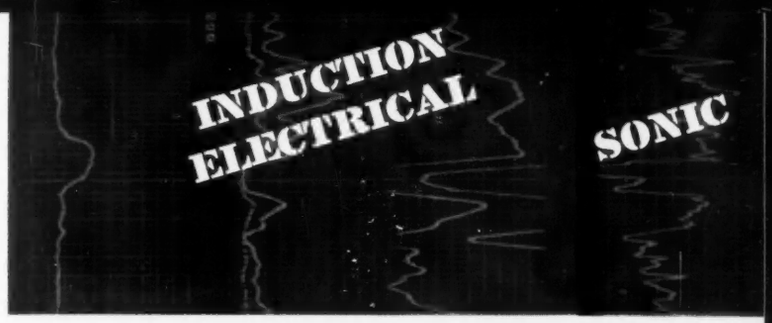
Ask your Halliburton Tester about using this proven performer in your next test. You'll be glad you did!

FOR TESTING RESULTS YOU CAN TRUST!

TESTING SERVICES

Halliburton
COMPANY . DUNCAN OKLAHOMA

For more data on advertised products, use Readers' Service Cards, last page.



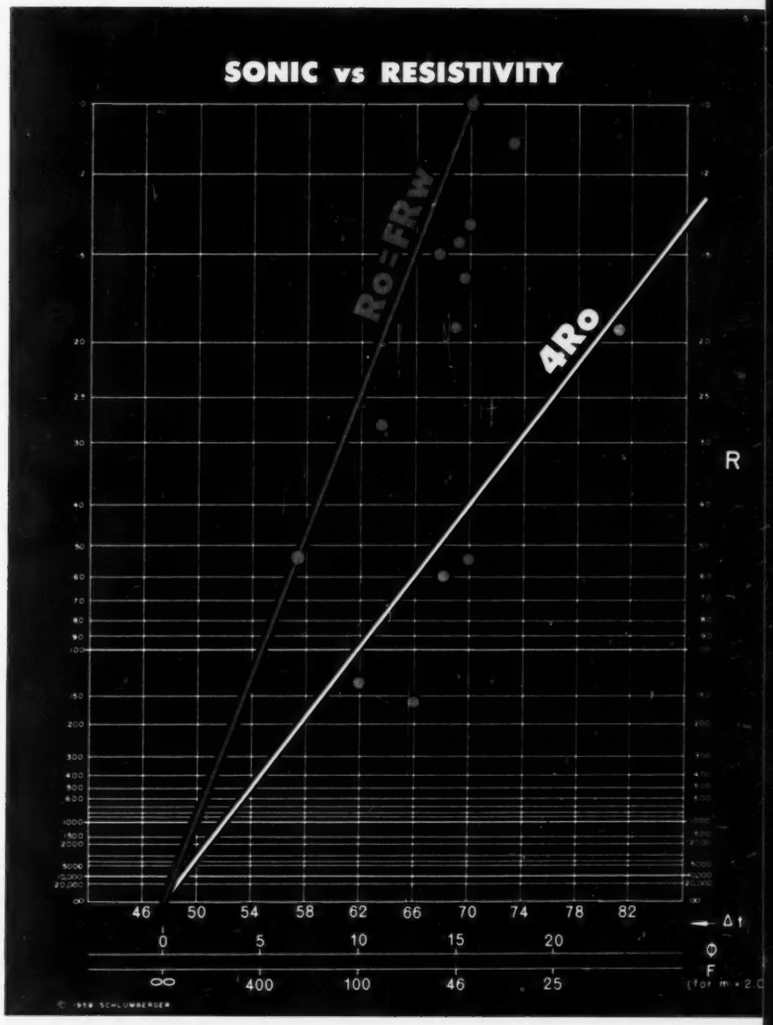
Schlumberger Sonic and Resistivity Logs Simplify Oil Finding!

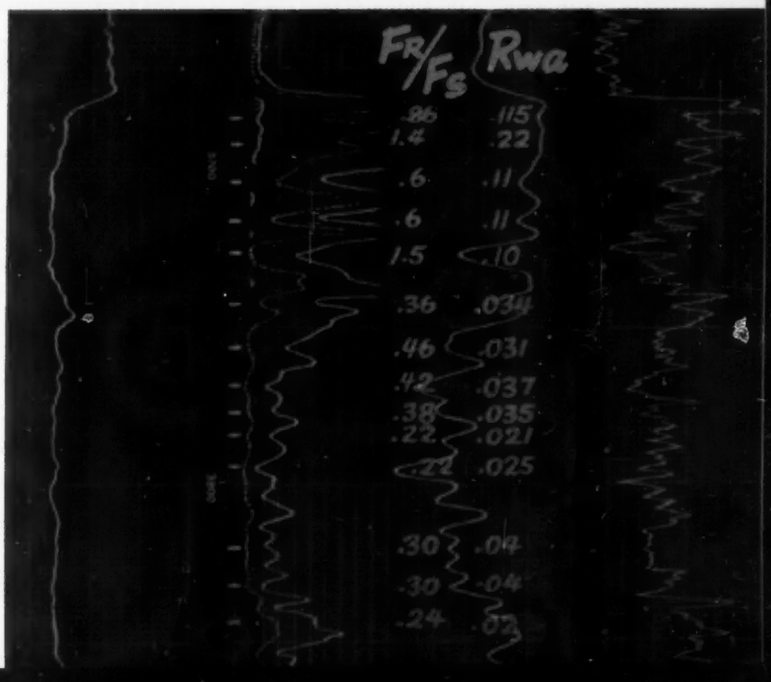
Oil and gas horizons are graphically identified by simple comparisons of Sonic and Resistivity data. These fast methods of interpretation are appropriate for well-site application. Potentially productive zones thus found can be further investigated by quantitative methods—or can be checked by sidewall cores and formation tests.

Ask a Schlumberger engineer in your area to demonstrate the benefits you can derive from Sonic and Resistivity Logs in your well program.

THE [illegible] OF THE OIL INDUSTRY*

SCHLUMBERGER

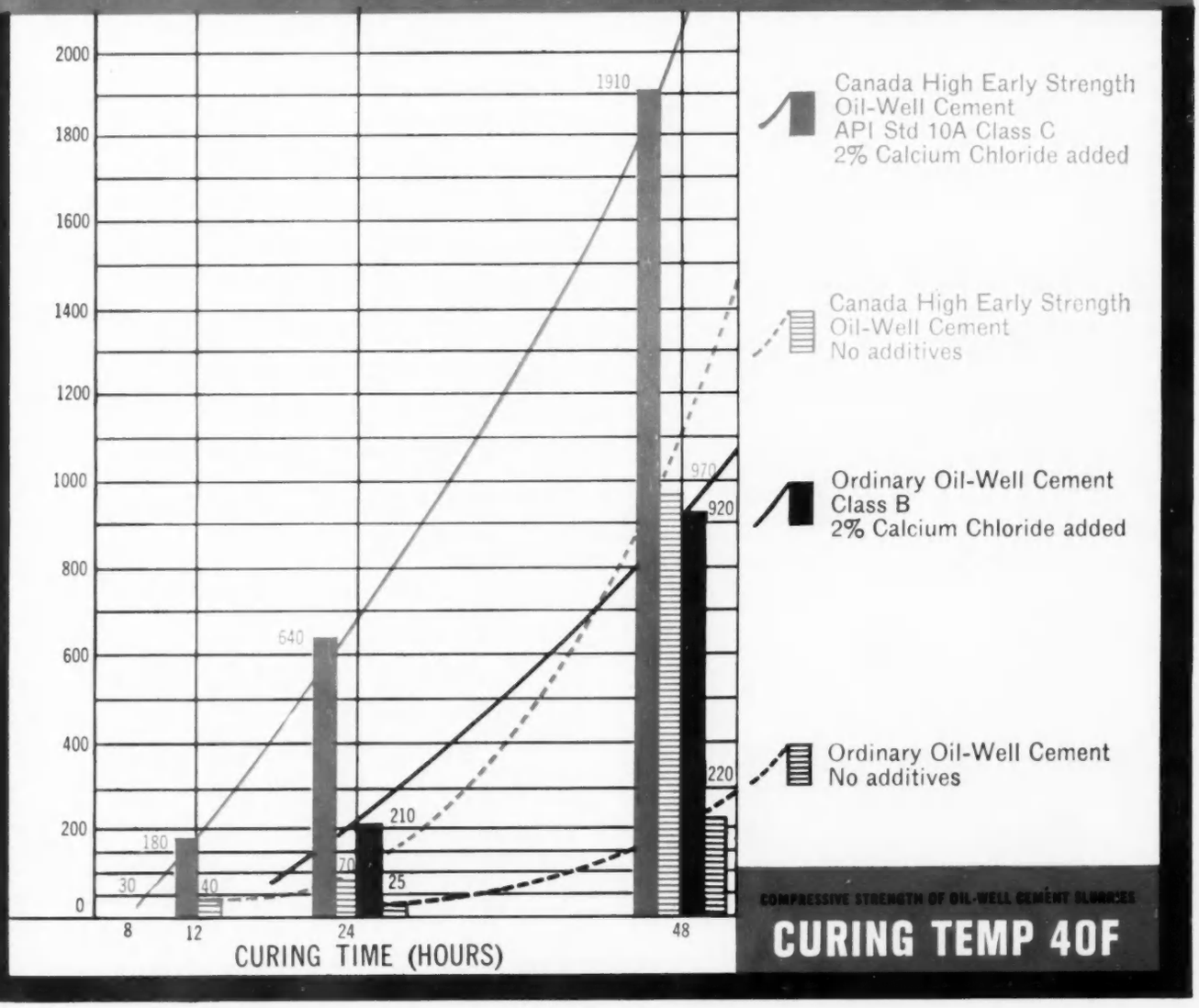




NO TIME OF YEAR FOR TB. Is there ever a right time? Of course not. But Christmas, more than any other season, should be a time of glowing good spirits, health and happiness. In the fight against TB, it can at least be a time of hope—when millions of healthy Americans take an extra moment to help with each Christmas Seal they use. ✝ Give that spark of hope—and the needed help—by using Christmas Seals. What could be more fitting for a season of good will to men? ✝ Answer your Christmas Seal letter today. ✝

PROVED BY LABORATORY AND FIELD TESTS

CANADA HIGH EARLY STRENGTH OIL-WELL CEMENT



HIGH EARLY STRENGTH and HIGH YIELD PER BAG

On a recent test hole, bottom temperature 40F, Canada High Early Strength Oil-Well Cement yielded 11% more slurry and saved 12 hours waiting time.

- Each bag of this Oil-Well Cement yields 1.24 cu. ft. of slurry at a density of 14.8 lb. per gal. compared with a normal yield of only 1.09 cu. ft. at a density of 15.5 lb. per gal.
- The graph illustrates the strength obtained at early ages. A sure casing set of more than 500 p.s.i. has been reached in 24 hours compared with 36 hours with ordinary cement.

WRITE NOW for full technical data! Ask any of the Canada Cement Offices listed here for the new brochure on Canada High Early Strength Oil-Well Cement.

Canada Cement
COMPANY, LIMITED
CANADA CEMENT BUILDING,
MONTREAL, P.Q.

WESTERN OFFICES:
EDMONTON
CALGARY
SASKATOON
REGINA
WINNIPEG

Aluminum well guard platforms in offshore duty

Save $800 per year in

upkeep, cost 10% less

A major oil producer has just installed the first offshore aluminum well guard off the southern tip of Padre Island, Texas. These guards are used in shallow offshore production to protect the well head. In addition to providing excellent corrosion-protection, the aluminum well guard platforms offer substantial cost reductions:

The aluminum platform actually costs 10% less initially than a steel one. Reason—for corrosion protection, steel platforms require a taped coating that averages about $1200 per structure.

Steel platforms require quarterly maintenance inspection—costing $400 per year—not necessary with aluminum.

Steel platforms require new coatings—approximately every three years. Aluminum platforms will never need protective maintenance—estimated yearly savings: $400.

Total yearly savings in maintenance—$800.

In addition to these important savings, aluminum provides other advantages. It is lightweight and easy to fabricate. This means that the well guard unit could be prefabricated on shore, and easily transported and installed. Aluminum's non-sparking property is another advantage.

Reynolds engineers worked very closely with Brown & Root, Inc. in the design and fabrication of this unit. Standard 10" diameter schedule 10 aluminum pipe was used for the legs, and 6" diameter schedule 40, for the bracing members. Aluminum grating serves as the platform deck.

Actual installation involves placing of the aluminum well guard unit over the completed well and then driving steel piles through the tubular aluminum legs. Concrete grouting is poured between the steel and aluminum legs to prevent galvanic corrosion.

Workmen guiding steel pipe through aluminum leg that will protect and prolong the life of the steel. Standard 10" schedule 10 aluminum pipe was used for the legs. Cement grouting separates the aluminum pipe and the steel pipe.

Initial material cost doesn't fully determine final cost. Aluminum's light weight, ease of fabrication, and corrosion resistance often mean lower final costs. For information on how aluminum can help you cut costs, contact the leader in developing aluminum applications for the oil industry—Reynolds. Call the Reynolds office nearest you or write Reynolds Metals Company, P.O. Box 2346 -CV, Richmond 18, Virginia.

REYNOLDS ALUMINUM

Watch Reynolds new TV show "Harrigan & Son", Fridays;
also "All-Star Golf", Saturdays—ABC-TV.

Your problem...

... find oil fast at lower cost !

oedip *Map drawn and edited by the Institut Géographique National.*

Parentis - Lacq
Hassi-Messaoud - Zarzaïtine
Tiguentourine - Hassi R'Mel

COMPAGNIE GÉNÉRALE DE GEOPHYSIQU

50, RUE FABERT - PARIS 7e - PHONE : INValides 4

A single power source operates both EOT-Johnston Rod Counter-Balanced units shown pumping these offset wells. Units can be operated economically—efficiently—up to 160-acre spacing.

The new EOT-Johnston Rod Counter-Balanced unit is ideal for multiple completions. Can handle any depth . . . any fluid volume . . . and at considerable savings over conventional beam-type units.

6030

EOT

Rod Counter-Balanced

HYDRAULIC UNIT

Now . . .
Pump TWO WELLS for the Price of ONE!

For the operator who needs economical pumping with efficient operation, the new EOT-Johnston Rod Counter-Balanced Hydraulic Pumping Unit is the answer.

The new EOT-Johnston Rod Counter-Balanced unit can pump multiple completions . . . can pump offset wells up to 160-acre spacing . . . and at a saving up to 50% over conventional beam-type units!

The EOT-Johnston Rod Counter-Balanced unit contains a new design valve . . . a special four-way valve that eliminates charging the hydraulic pump suction. Field performance tests acclaim the EOT-Johnston Rod Counter-Balanced unit an engineering "break-through" for the hydraulic pumping method. Now, the economics of hydraulic pumping can be applied to any well, regardless of depth or volume of fluid to be handled.

Write for complete data on the new EOT-Johnston Counter-Balanced Hydraulic Pumping Unit . . . economical . . . efficient . . . pumps two wells for the price of one.

EOT

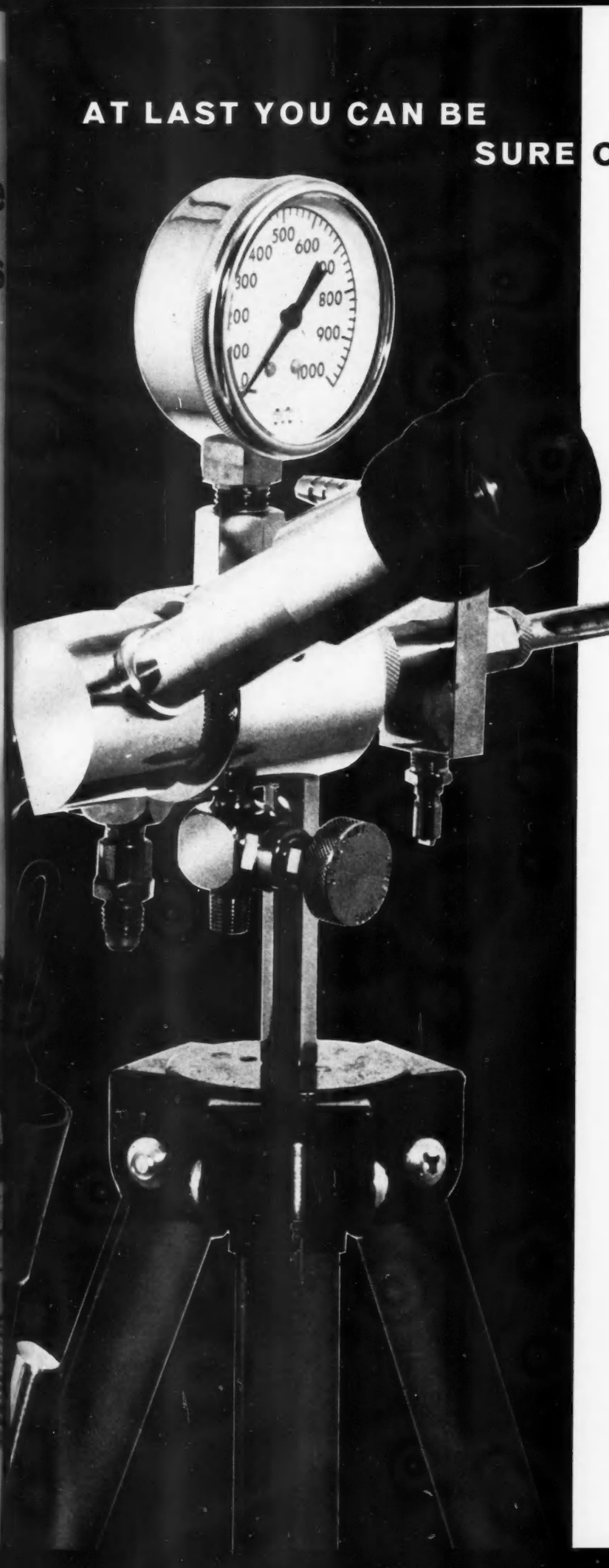
ENGINEERED OIL TOOLS, INC.

Branches: Odessa & Pampa, Texas; Oklahoma City, Oklahoma
General Offices: 1710 Burnett, Houston, Texas

Distributors:

EOT-Johnston Hydraulic Pumping Units available through your local supply stores in West Texas and Mid-Continent areas. WEST COAST: Lacy Oil Tool Co.; APPALACHIAN AREA: McJunkin Corp.; CANADA: Canadian Well Services, Ltd.; EXPORT: Wilson Supply Co., International Div.

Ni-Resist Ductile
New Combinations



AT LAST YOU CAN BE SURE OF

POSITIVE DEW POINT READINGS

The DEWTECTOR developed and proved by UGC INSTRUMENTS takes dew point reading out of the category of "opinion and interpretation" of the individual using the instrument.

The DEWTECTOR—for the standard dew point instrument used throughout the natural gas industry—removes all guess-work. The DEWTECTOR optical system illuminates the mirror and magnifies the dew point to such a degree that all doubt is removed.

The DEWTECTOR self-contained light source permits dew points to be taken at night or under any adverse weather or enclosure conditions. The 16X magnification permits ready differentiation between hydrocarbon and water dew points and between water dew and ice points.

The DEWTECTOR is lightweight, easy to carry, simple to attach, requires little effort to operate. The results are

POSITIVE, REPEATABLE AND SUBJECT TO VERIFICATION.

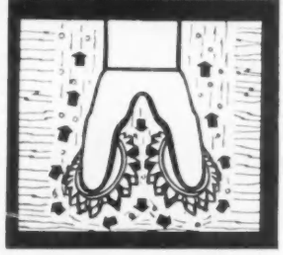
LOW IN COST—SPECIAL PRICES ON ORDERS FOR FIVE OR MORE.

Address inquiries to:
UGC INSTRUMENTS
P.O. Box 1407 • Shreveport, Louisiana • Phone UN1-4531-LD81

UGC INSTRUMENTS
A DIVISION OF UNITED GAS CORP.
DEWTECTOR

CECA

supply a full range of mud chemicals for all conditions



Drilling Mud Chemical Supply Service

The manufacturers of CLARSOL drilling bentonites and CECABAR barytes now offer a complete range of fully proven and tested mud chemicals from leading European sources. This service for full range supply shows marked economy in procurement and ensures properly phased deliveries.

MUD

CHEMICALS

by CECA

Available in all oil producing centres

Sales Offices in all European Countries.
Warehousing services available in certain major fields.
Laboratory and Technical Facilities for specific problems.

CECA

THE BRITISH CECA CO. LTD.
175, PICCADILLY, LONDON, W.I.
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Williams Bit and Tool Company

Bi-Center Diamond Bit will (1) Pass through a smaller hole than it will cut. (2) Follow a roller bit without having to reduce bit size. (3) Eliminate tight hole problems. (4) has built-in clearance to reduce junk hazard. This is an eccentric bit threaded on-center. Only a portion of the outside diameter has diamonds. Remainder has been reduced to provide the built-in clearance. Have a "tight hole" problem? Losing hole diameter in abrasive formation? Have excessive diamond gage wear due to reaming effect? Too much junk damage to diamond bits—especially after connections? Try a Bi-Center diamond bit—a bit that will pass through a 7⅝-inch hole and cut a 7⅞-inch hole; a bit that will pass through a 6-inch hole and cut a 6⅛-inch hole.

For more data on above item, circle E475 on postcard, Page 243

J. H. Williams & Co.

Chain Pipe Tongs are now equipped with new heat-treated flat link chains. A 40 percent increase in strength extends chain life and tong performance. Flat links are made from selected steel; rivets and swing links from alloy steel. All chains are heat-treated after assembly and proof-tested to two-thirds of their breaking strain.

For more data on above item, circle E476 on postcard, Page 243

Open-End, Combination Box Open-End and 15° and 45° Offset Box Wrenches are of improved design. Among the many refinements to the

Here's how they **keep mud moving** *on "Mister Cap"*

Mounted directly above the mud tank—with its steel shaft reaching down into the mud—is a LIGHTNIN Mixer.

At the bottom of the turning shaft, a big turbine-type impeller drives the mud in a steady, powerful flow. All through the tank, mud keeps mixing, interchanging, equalizing. It doesn't settle out. It's always in condition. And if necessary, mud weight and viscosity can be changed at the drop of a hat.

This is what you'll see aboard "Mister Cap," the 4000-ton all-electric offshore mobile drilling barge that brought in its first producer in just eight days—and has been meeting its owners' expectations ever since as a model of drilling efficiency.

You can get faster, safer, more productive drilling with LIGHTNIN Mixers on *your* rigs. Fewer stops. No long waiting for mud to get into condition. Surer protection against blowouts.

Cut pump maintenance cost, too. When you have LIGHTNIN Mixers you don't have to use your standby pump for jetting mud. It's always instantly available for use on the hole.

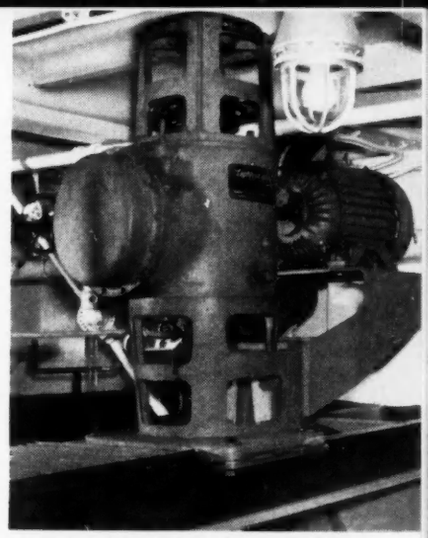
See for yourself why so many offshore and land rigs use this simple, fast way to control mud. Ask your LIGHTNIN Mixer representative to set up a visit to one of these rigs in your area. Call him today (he's listed in Composite Catalog). Or write us direct.

"Lightnin' Mixers"

MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 197-n Mt. Read Blvd., Rochester 3, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 19, Ont.



Mud mixers like this one keep all of the mud in suspension, with uniform gravity and viscosity.

THREE-LEGGED JOB-HOPPER "Mister Cap" spudded and drilled its first producing well in 8 days; has worked steadily in the Gulf since November 1957. Built by R. G. LeTourneau Inc., the barge is owned and operated by Barnwell Offshore, Inc.

Atlas

ALWAYS MAKES BETTER TIME

on delivery of casing, tubing and line pipe

ATLAS PIPE INC.

A Division of Atlas Bradford Company
OUR NEW ADDRESS: 3600 YOAKUM BLVD.
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Tulsa Phone: Diamond 3-6791

DISTRIBUTOR FOR
REPUBLIC STEEL CORPORATION

For natural gas pipelines across the country...

Mobil

offers famous products and expert engineering service

From coast to coast and border to border, Mobil serves the specialized needs of natural gas transmission lines.

Wherever your compressor and drying stations may be, Mobil's famous lubricants and technical engineering service are close at hand. Pipelines are turning to Mobil in growing numbers for dependable desiccants as well.

Thirteen Chief Engineers and over 250 Industrial Representatives are constantly on call across the nation to provide you with experienced professional assistance. Check the benefits you can receive from these men—expert engineering service, help in solving special problems, laboratory analysis of lubricating oils, aid in desiccant engineering, technical assistance in setting up liquid hydrocarbon recovery units.

These specialists and the whole Mobil organization stand ready to help you boost efficiency and cut costs. Call us today.

MOBIL OIL COMPANY, 150 East 42nd Street, New York 17, N. Y.

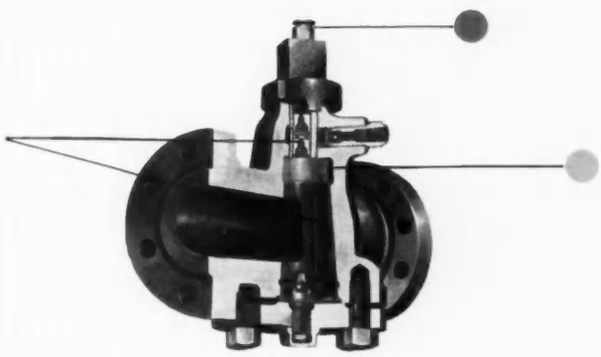
Sven Nordstrom (1881-1951) made world's first lubricated plug valve in 1914. First "lubricant" was a wickless mine candle compressed into the valve by a bolt. Most lubricated plug valves since then have been based on Nordstrom's original ideas.

he tore the wick from a candle

. . . and conceived a better valve for you

When Sven Nordstrom used a mine candle to lubricate his first lubricated plug valve, he created an entirely new valve concept . . . a valve that didn't rely for its effectiveness on wedging metal against metal.

At the time it was patented, in 1916, Nordstrom's valve was the most modern, advanced valve in the world. That is still true —for while the fundamentals have remained the same, Nordstrom's original patents have been continuously improved on through over 80 basically new patents. Over the last 44 years (and millions of valves) each innovation has helped people in a wide variety of industries solve new and even more difficult flow control problems. Look inside the modern Rockwell-Nordstrom valve, shown below, for just a few of the reasons why it will help you solve your flow control problems, too.



PERFECT APPLICATION OF A PRINCIPLE

- Lubricant quickly, easily injected through Rockwell fitting.
- Lubricant travels through Sealdport® system to create powerful seals against leakage and prevent metal-to-metal wear between plug and body . . . note seats never exposed to the line.
- Lubricant hydraulically jacks plug minutely from seat for instant quarter-turn operation.

Rockwell-Nordstrom is the original and world's most complete line of lubricated plug valves. Available in sizes from ½" to 36" and pressures to 15,000 lb. For additional information, see your supplier or write: Rockwell Manufacturing Company, Pittsburgh 8, Pennsylvania. Canadian Valve Licensee: Peacock Brothers Limited. If you live outside the USA, write: Rockwell International S.A., Geneva, Switzerland.

Lubrication Makes The Difference

ROCKWELL-Nordstrom VALVES

another fine product by

ROCKWELL

Survival of the Fittest

A month in the woods with only a bare survival kit separates the men from the boys, with a vengeance. Darwin's law of the survival of the fittest still pertains today in connection with certain segments of the oil industry. And this matter of survival in the oil business is a deadly serious one, not separating the men from the boys, but the quick from the dead.

What can be described casually as a "technical readjustment" by someone in a newsletter is an entirely different matter to the man whose bread and butter are at stake. Many supply stores, for example, are looking for a survival kit of their own, after taking a long, hard look at the age of their receivables. What to do with receivables 90 and 120 days old requires as much skill and know-how as living a comparable time in the woods with only a pocket knife.

Unfortunately there's no magic wand, no miraculous rescue by helicopter. The best help you can get is from a man who knows your business, knows the oil business, and understands credit and the management of money. You'll find men like these in the Oil and Gas Department of The National Bank of Commerce of Houston. You'll find that if anyone can help you they can. But, remember, they work no miracles; so come before it's too late to help.

THE NATIONAL BANK OF COMMERCE
OF HOUSTON

MAIN, TRAVIS, AND CAPITOL

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

"WE KEEP OUR CARDWELL RIGS BUSY ON CONTRACTS WE COULDN'T GET WITHOUT THEM!"

Mr. Orville "Slim" Hegwer
Hegwer Drilling Co., Inc.

"In the past, there were times when we found ourselves with the wrong rig for the work that was available. I can happily say that this situation rarely exists any more," says Mr. Hegwer. "With our Cardwell KM250 and KM210 rigs we can handle most any job inside the 15,000-foot range. We can perform more jobs faster, at less cost to us and the operator. Drilling, Servicing, Completion, Workover—it makes little difference! We drive in anywhere with these rigs, get on and off the well in less time than other units. We have plenty of power and can keep up with any rig on shallower drilling. We cut down trip time, too! This is extremely important to being competitive on workover, servicing, and completion work. Low maintenance costs allow us to keep day rates to a minimum. Both rigs are flexible, convenient for the driller and roughnecks alike. The hands really take care of the rigs because they're proud of them. And, so are we!"

Like Mr. Hegwer, you will find that Cardwell KM250 and KM210 rigs allow you to be competitive and still make a profit. Contact a Cardwell representative to find out just how profitable they can be.

for tomorrow's equipment—see Cardwell today!

cardwell MANUFACTURING COMPANY, INC.

Box 2001, Wichita, Kansas • Cable: ALLSTEEL • Phone: AMherst 7-3311

Foreign Manufacturing Licensees: LE GRAND ROCHESTER LTD., London S.E. 7, England; TRAUZL-WERKE, A.G. Vienna 21, Austria

QUICK RETRIEVING OF A FISH CAN BE ACCOMPLISHED

MAJOR FISHING JOBS CAN BE PREVENTED

WHEN YOU KEEP A

BOWEN RELEASING AND CIRCULATING OVERSHOT

AVAILABLE

A high percentage of fishing jobs are the result of twist-offs. Immediate recovery action can PREVENT a troublesome, time-consuming, expensive fishing job.

The longer a fish remains in the hole, the greater the fishing problem becomes and the more difficult and costly it is to retrieve. Restore Circulation — Recover The Fish Fast — Prevent High Expense with a BOWEN RELEASING AND CIRCULATING OVERSHOT!

Bowen Overshots are compact, durable and powerful, and are capable of withstanding extreme pulling and jarring strains without damage to the tool or fish.

Bowen Overshots can be dressed to recover many different sizes of fish, to mill over, catch and pack off. They are available in a complete range of sizes for tubing and drill strings.

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For over 25 years—the world's leading manufacturer of fishing and specialty tools.

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TIW

THE BEST CEMENT JOB WITH THE LONGEST LINERS

TYPE **LP** LINER SETTING ASSEMBLY

Time-Tested Equipment in Experienced Hands...

TIW. . . pioneer developer of liner setting equipment . . . provides time-tested experience in successfully cementing the longest liner string your well requires.

T-I-W trained field engineers supervise the running of your liner . . . with dependable T-I-W Liner Setting Equipment . . . and will supervise cementing operations, when desired, to assure maximum efficiency.

The T-I-W Type LP Liner Setting Assembly is recommended for setting long liners, where wiping the strings clean of cement is desired.

The assembly, shown at right, consists of a Type LS Set Shoe (with or without back pressure valves), a Landing Collar which provides a seat for the Wiper Plug, a Liner Hanger (when it is desired to suspend the liner), a Type L Packer with or without Hold-Down Slips (a Liner Setting Collar can be furnished when packer is not desired), a Liner Wiper Plug pinned to the Inverted Swab Assembly, a Type L Setting Tool with setting string connection, a cementing Manifold with setting string connection to retain the Pump Down Plug, and a Pump Down Plug to wipe the setting string.

CALL, WRITE or WIRE TODAY for complete details on dependable T-I-W Liner Setting Equipment and experienced field supervisory service.

The Hanger With Most Positive Performance

TEXAS IRON WORKS

Manufacturers of: T.I.W. Portable Rigs . . . T.I.W. Safety Joints . . . T.I.W. Rotary and Casing Slips . . . T.I.W. Grief Stem Safety Valves . . . T.I.W. Packers for every purpose . . T.I.W. Pump Chambers . . . T.I.W. Mudmixers . . . and many other oil field tools.

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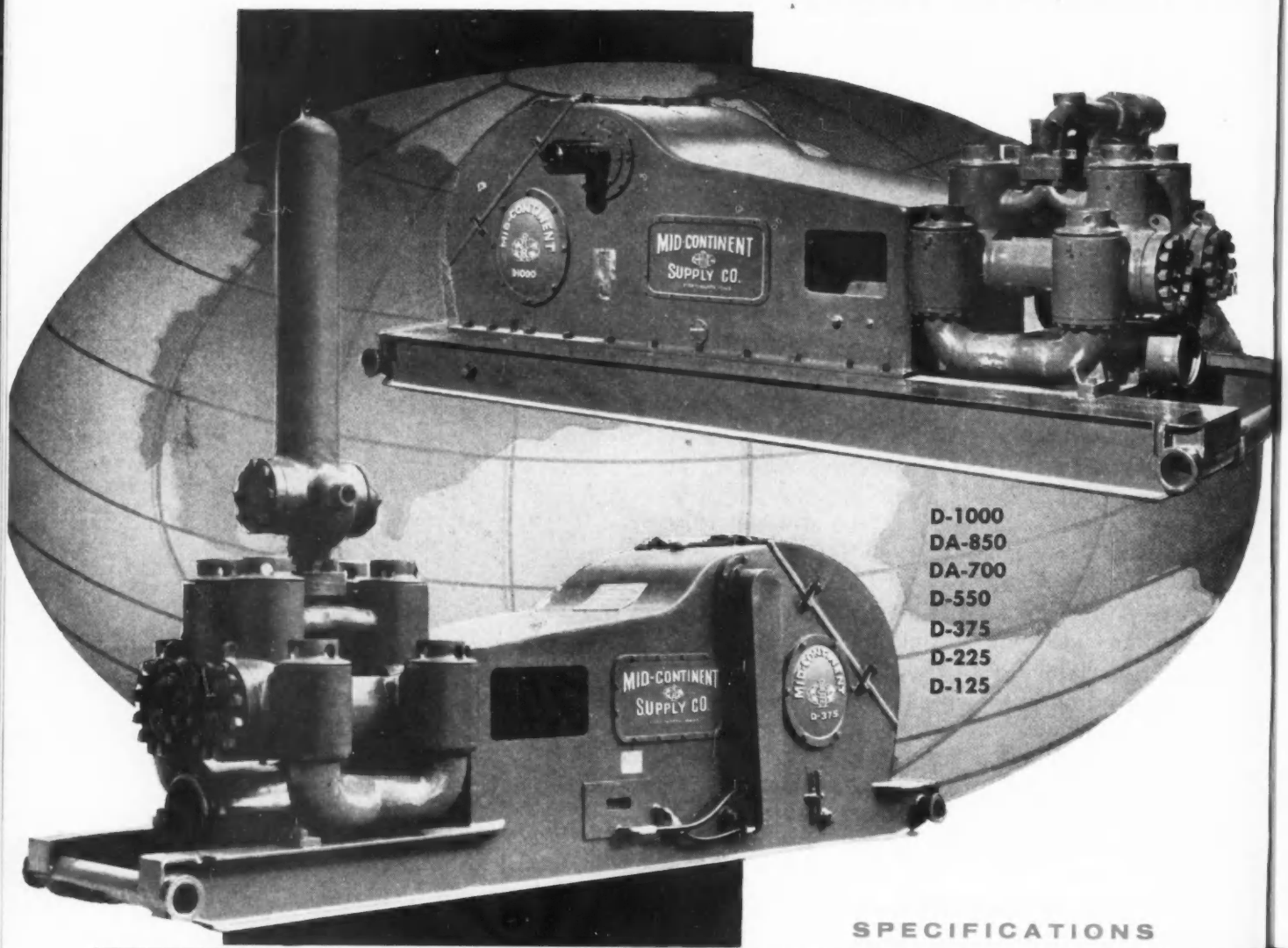
FOR DRILLING OPERATIONS ANYWHERE IN THE WORLD THERE IS A

Mid-Continent Emsco Slush Pump

...Seven Slush Pumps to match



D-1000
DA-850
DA-700
D-550
D-375
D-225
D-125

SPECIFICATIONS

	D-125	D-225	D-375	D-550
Maximum Liner Size by Stroke	7¼" x 10"	7¼" x 12"	7½" x 14"	7½" x 16"
Piston Rod—Diameter and Taper	1¾"—3 API	1⅞"—4 API	2"—4 API	2½"—5 API
Fluid End Test Pressure	3500 psi	3500 psi	4000 psi	6000 psi
Suction Manifold	8" Female	8" Female	10" Male	10" Male
Discharge Manifold	3" Female	3" Female	4" Female	4" Female
Gear Ratio	4.96:1	5.43:1	5.04:1	5.04:1
Gear Face	5"	9"	11¼"	13"
Pinion Shaft Extension (Clear)	9½"	9⅞"	12⅛"	15½"
Bearing	Roller	Roller	Roller	Roller
Keyway	1" x ½"	1" x ½"	1¼" x ⅝"	1½" x ¾"
Eccentric Drive Bearings	Roller	Roller	Roller	Roller
Main Shaft Bearings	Self Align	Self Align	Self Align	Self Align
Crosshead Bearings	Double Needle Roller	Double Needle Roller	Double Needle Roller	Double Needle Roller
Length—Overall	11'—2"	12'—6"	14'—8"	16'—8"
Width				
Overall— Inc. Shaft Ext.	4'—½"	4'—1⅝"	4'—8"	6'—8¼"
Fluid End	3'—8½"	3'—8½"	4'—1"	4'—6½"
Power End—Inc. Shaft Ext.	4'—½"	4'—3⅛"	4'—4¹¹⁄₁₆"	6'—5"
Skid	3'—3⅞"	3'—7⅝"	3'—6¾"	6'
Height—Less Air Chamber	3'—9"	4'—⅛"	4'—9"	5'—4½"
Approximate Weight	8,700 lbs.	13,000 lbs.	18,300 lbs.	29,000 lbs.

EXPANDING

THE MID-CONTINENT LINE OF DRILLING MACHINERY

DESIGNED FOR THE JOB

your exact power, pressure and volume requirements

Pioneered by Mid-Continent Supply Co. since 1938 throughout the oil fields of the world, this line of all steel, roller bearing pumps assures fastest penetration under all types of drilling conditions. A complete range of sizes to cover minimum and maximum conditions enables the user to select a pump to meet the exact job . . . expertly designed for light-weight, easy maintenance, durability and dependability. And Mid-Continent backs these pumps with fast, dependable field service from strategically located parts and service centers.

For assistance in selecting a Mid-Continent Emsco pump for your exact requirements, contact your nearest Mid-Continent representative.

MID-CONTINENT — SUPERMARKET FOR THE OIL INDUSTRY

DA-700	DA-850	D-1000
8¼" x 16"	8¼" x 18"	8¼" x 18"
2¾"—6 API	3"—6 API	3"—6 API
6000 psi	6000 psi	6000 psi
10" Male	12" Male	12" Male
4" Female	4" Female	4" Female
5.05:1	5.03:1	4.76:1
14"	16"	18"
14"	15"	15"
Roller	Roller	Roller
1½" x ¾"	1½" x ¾"	1½" x ¾"
Roller	Roller	Roller
Self Align	Self Align	Self Align
Double Needle Roller	Double Needle Roller	Double Needle Roller
18'—4⅞"	20'—2"	20'—2"
7'	8'	8'
3'—8½"	6'—6"	6'—6"
6'—7½"	6'—4¼"	6'—4¼"
7'	8'	8'
6'	6'—4½"	6'—6"
37,500 lbs.	48,800 lbs.	50,500 lbs.

PERFORMANCE DATA

	Strokes Per Min.	Max. B.H.P. Input	Operating Data	LINER SIZE										
D-1000				8¾"	8"	7¾"	7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"
	60	1000	G P M Output	933	874	817	760	705	653	603	553	507	463	41
	50	833	G P M Output	778	728	680	633	588	545	503	461	423	385	34
	40	667	G P M Output	623	582	544	506	470	436	402	369	338	308	27
			Gallons per Revolution	15.56	14.57	13.59	12.66	11.75	10.89	10.05	9.22	8.45	7.71	6.9
			Max. Disch. Pressure	1562	1668	1782	1917	2068	2229	2418	2635	2871	3153	348
DA-850				8¼"	8"	7¾"	7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾
	60	850	G P M Output	933	874	817	760	705	653	603	553	507	462	41
	50	708	G P M Output	778	728	680	633	588	545	503	461	423	385	34
	40	567	G P M Output	623	582	544	506	470	436	402	369	338	308	27
			Gallons per Revolution	15.56	14.57	13.59	12.66	11.75	10.89	10.05	9.22	8.45	7.71	6.9
			Max. Disch. Pressure	1328	1418	1515	1629	1758	1895	2055	2240	2440	2680	295
DA-700				8¼"	8"	7¾"	7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"	5½
	65	700	G P M Output	909	852	796	742	690	640	591	544	499	456	414	37
	55	592	G P M Output	769	721	674	628	584	541	500	460	422	386	350	3
	45	485	G P M Output	630	590	551	514	477	443	409	377	346	316	287	2
			Gallons per Revolution	13.99	13.10	12.25	11.42	10.61	9.84	9.09	8.37	7.68	7.02	6.37	5.7
			Max. Disch. Pressure	1120	1197	1281	1374	1478	1593	1726	1875	2044	2236	2463	27
D-550				7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"	5¼"	5"	4¾
	65	550	G P M Output	751	699	649	600	553	508	464	423	383	346	309	27
	55	465	G P M Output	636	592	549	508	468	430	393	358	325	293	262	23
	45	381	G P M Output	520	484	449	415	383	352	321	292	266	239	214	19
			Gallons per Revolution	11.56	10.76	9.98	9.23	8.51	7.82	7.14	6.51	5.90	5.32	4.76	4.2
			Max. Disch. Pressure	1067	1146	1235	1336	1449	1577	1727	1894	2090	2317	2590	29
D-375				7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"	5¼"	5"	4¾
	70	375	G P M Output	723	674	626	581	536	494	472	414	376	341	307	2
	60	321	G P M Output	620	577	537	498	460	423	405	355	323	292	263	2
	45	241	G P M Output	465	433	403	373	345	318	303	266	242	219	197	1
			Gallons per Revolution	10.328	9.626	8.948	8.294	7.663	7.056	6.743	5.913	5.378	4.867	4.379	3.9
			Max. Disch. Pressure	744	810	871	939	1018	1104	1156	1318	1451	1600	1777	19
D-225				7¼"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"	5¼"	5"	4¾"	4½
	70	225	G P M Output	580	539	500	462	426	391	357	325	295	268	237	2
	60	193	G P M Output	497	462	429	396	365	335	306	279	252	227	203	1
	45	145	G P M Output	373	347	321	297	274	251	229	209	189	171	153	1
			Gallons per Revolution	8.283	7.703	7.142	6.602	6.083	5.583	5.104	4.646	4.208	3.790	3.392	3.0
			Max. Disch. Pressure	565	607	654	708	769	838	916	1007	1111	1234	1379	15
D-125				7¼"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"	5¼"	5"	4¾"	4½
	85	125	G P M Output	560	557	509	471	434	399	365	332	301	271	243	2
	70	103	G P M Output	496	459	416	388	357	328	300	273	248	223	200	1
	55	81	G P M Output	382	361	329	305	281	258	236	215	196	176	157	1
			Gallons per Revolution	6.940	6.456	5.988	5.538	5.104	4.688	4.288	3.906	3.540	3.192	2.860	2.5
			Max. Disch. Pressure	308	326	357	386	419	456	499	548	604	670	748	8

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THE NEW LOW PRESSURE LINE WITH HIGH PRESSURE FEATURES

CMT and TH Heads

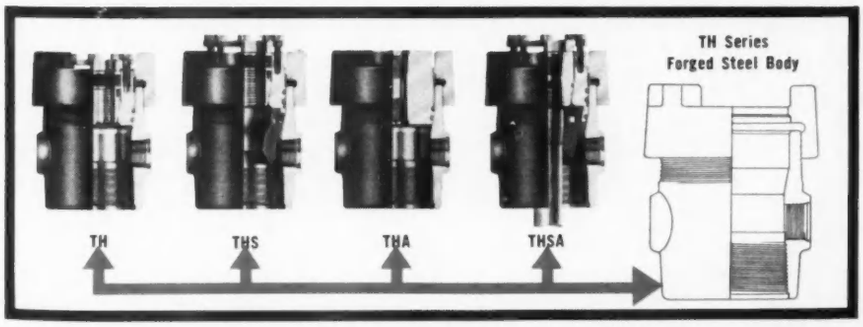
O·C·T Independent Well Heads

Bill will you look into this line? J.L.

New O-C-T independent (low pressure) CM Series casing heads and TH Series tubing heads hold down your well-head costs because they give you low first cost and maximum parts interchangeability. Their great versatility lets you produce a well to final depletion without expensive well-head changes. Forged steel construction gives you greater strength and reliability than is possible with cast or fabricated construction. O-C-T independent well heads also provide positive seals between strings, low silhouette, and ready adaptability to blowout preventers or other flanged heads.

O-C-T CM Series casing heads feature time-proved, wraparound slips for suspending the casing, and a simple, reliable, lip-type seal between strings. The two casing heads in this series, the CM and the CMT, are identical except that the CMT is equipped with a male-threaded adapter. This adapter has a secondary pack-off that seals around the inner casing and confines pressure to a minimum area. All sizes of CM Series casing heads are full opening to allow drill bits or centralizers to pass. Bottom connections are male threaded so that the heads can be screwed directly into casing collars.

CMT Head



All tubing heads in the TH Series use the same forged steel bodies, which are available for 4½-inch through 7-inch casing. The various hanger and stripper combinations shown above are interchangeable in this body and give the line its flexibility. They allow use of slips (TH), slips and a stripper (THS), a threaded hanger (THA), or a threaded hanger and a stripper (THSA). Standard API companion flanges can be used to attach blowout preventers. TH Series tubing heads are also available with flanged bottoms.

Write for our booklet "O-C-T Independent Well Head Equipment."

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OIL CENTER TOOL CO.

SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

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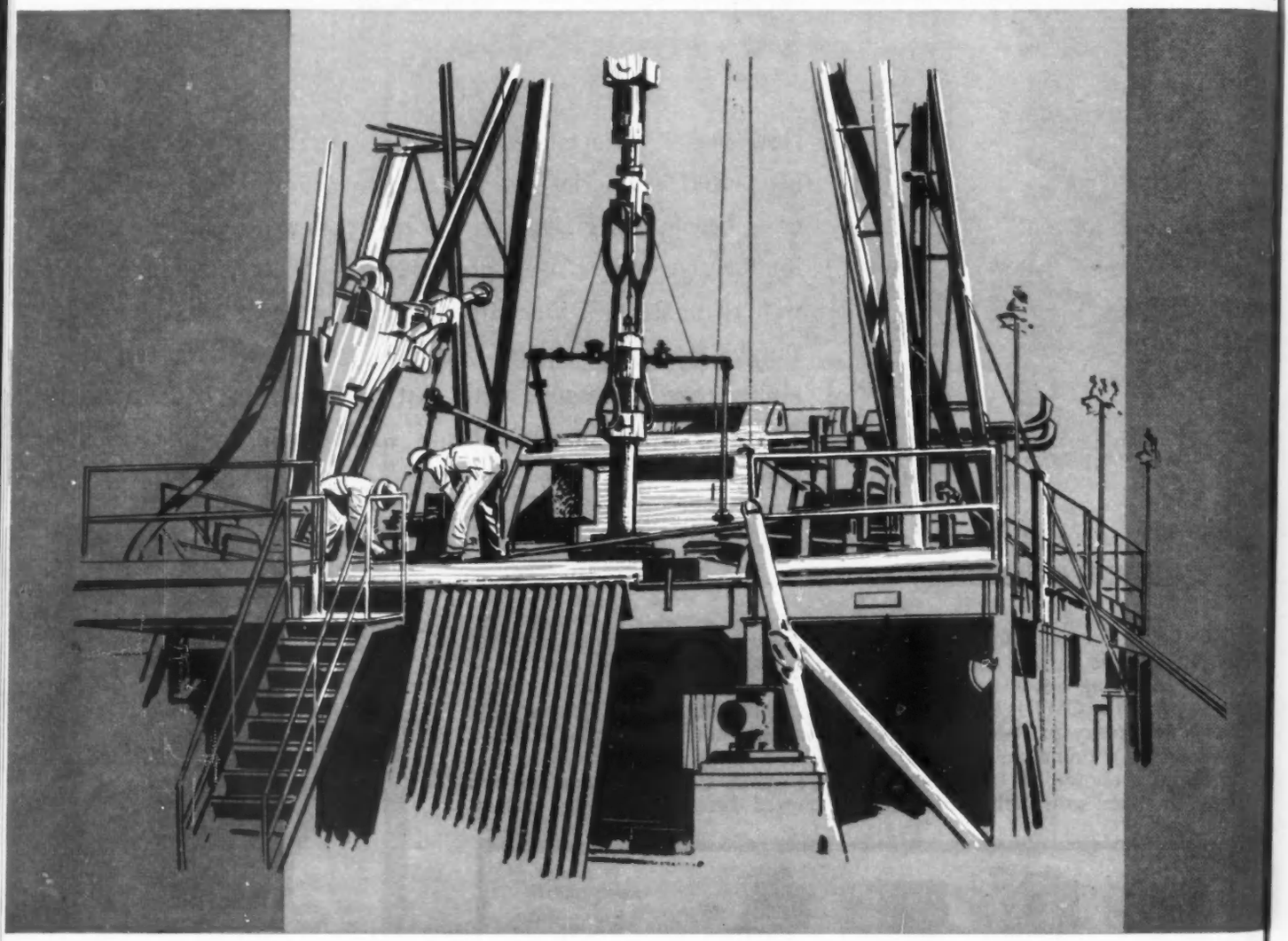
FOR BETTER COMPLETIONS...

CUSTOM DESIGN YOUR CASING STRING



Here is another way Halliburton helps you combat well completion problems. In addition to the multitude of special cements and additives—the advanced equipment—the skilled personnel . . . Halliburton also provides a complete selection of Casing Floating, Guiding and Self Fill-Up Equipment. From this large line of proven performers, you can custom design a cementing string that will best fit your specific requirements—everytime.

275 HALLIBURTON SERVICE CENTERS JUST MINUTES AWAY FROM YOUR WELL

McCULLOUGH
SALINITY LOG
with scintillometer®
...a nuclear log that tells
OIL *from* SALT WATER

The McCullough Salinity Log determines the presence and degree of saline fluids in formations surrounding the bore-hole. It will distinguish between oil and salt water and can be used in open or cased hole. Providing hole diameter is not extreme, it may be used where air or gas or highly saline fluid was used for drilling.

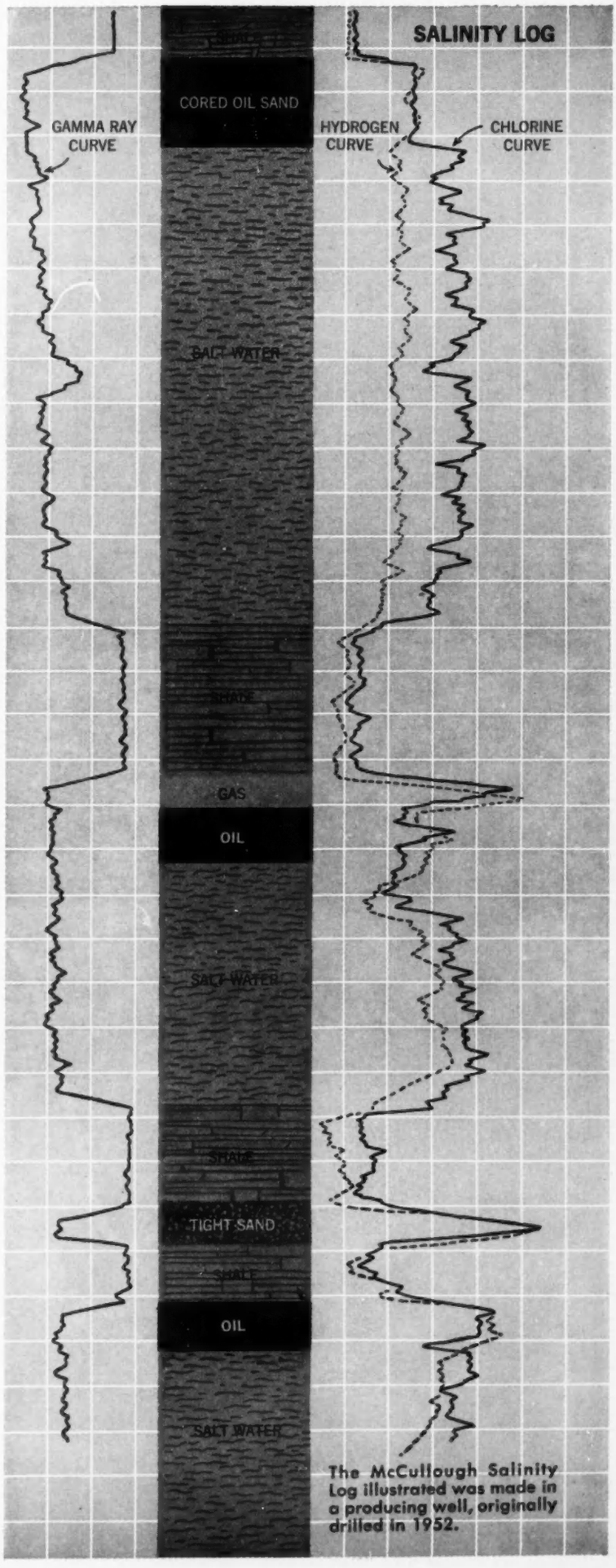
A "chlorine" curve and a "hydrogen" curve are recorded simultaneously at the same depth elevation with a single detector. These curves are compared to indicate the amount of salt, NaCl in particular, that is present in the formations being investigated. In potential oil bearing formations the absence of salt is indicative of the presence of oil.

The recording of the two curves simultaneously is considered essential. It eliminates the possibility of a depth discrepancy between two curves which are recorded separately. It also insures the recording of information under identical physical conditions—of extreme importance in interpreting the two curves.

A higher counting rate and greater instrument efficiency allows an increased spacing (23½ in.) between the source and the Scintillometer. This provides the added benefit of a proportionately larger zone of investigation.

Take a look at these features:

- **Distinguishes between salt water and oil in liquid bearing formations.**
- **Determines the degree of salinity in formation fluid.**
- **Identifies salt water zones that must be blanked off.**
- **Makes possible water saturation calculations for potential oil bearing zones.**
- **Shows salt water and oil zone contact under suitable conditions.**
- **Aids in determining gas/oil contact.**
- **Helps determine if it is economically practical to set casing on new completions.**
- **Aids in evaluating correct depth to set casing string.**
- **Accurately re-evaluates old wells to locate potential cased-off production.**
- **A reliable tool for porosity determination.**



The McCullough Salinity Log illustrated was made in a producing well, originally drilled in 1952.

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TOOL COMPANY
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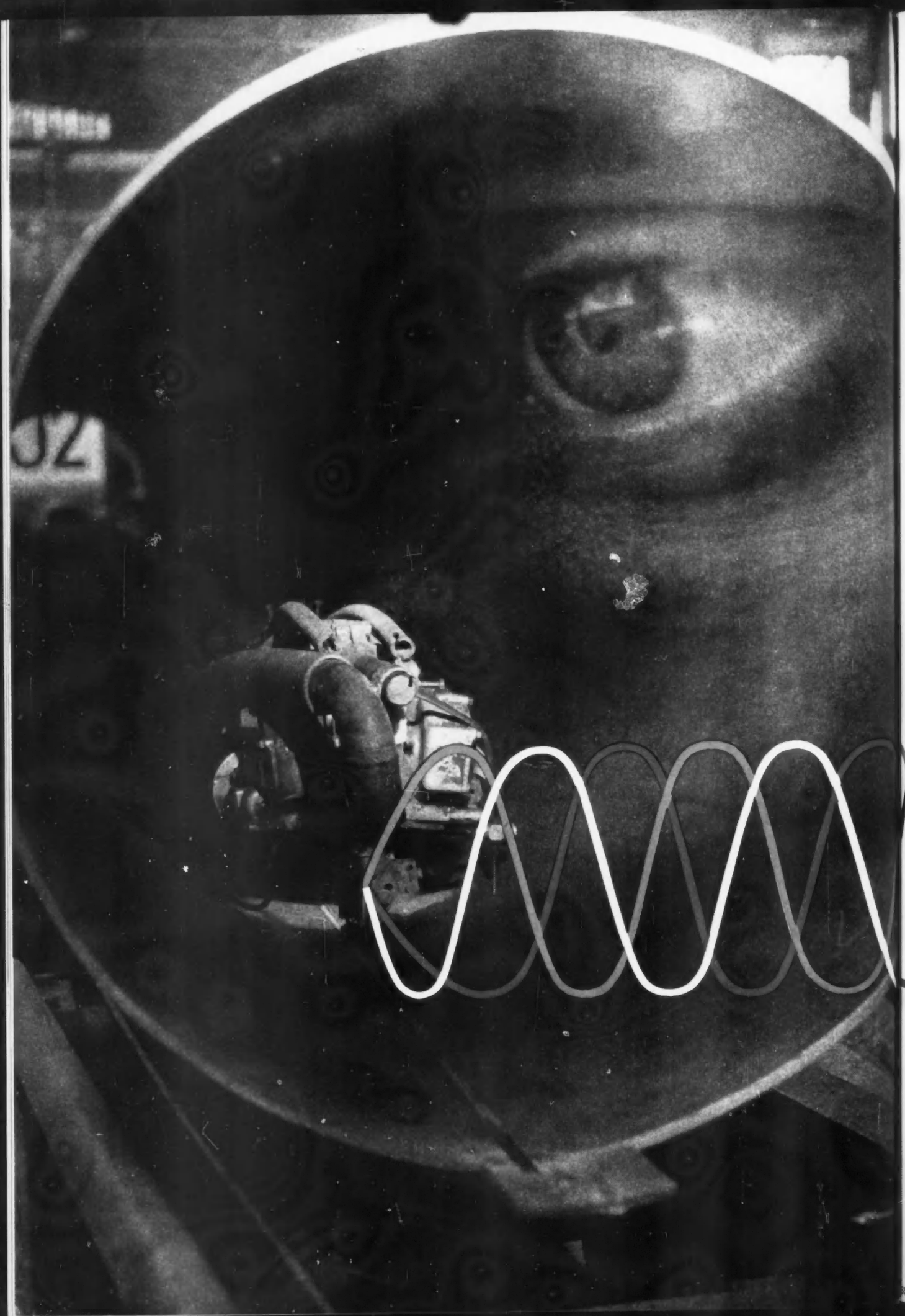
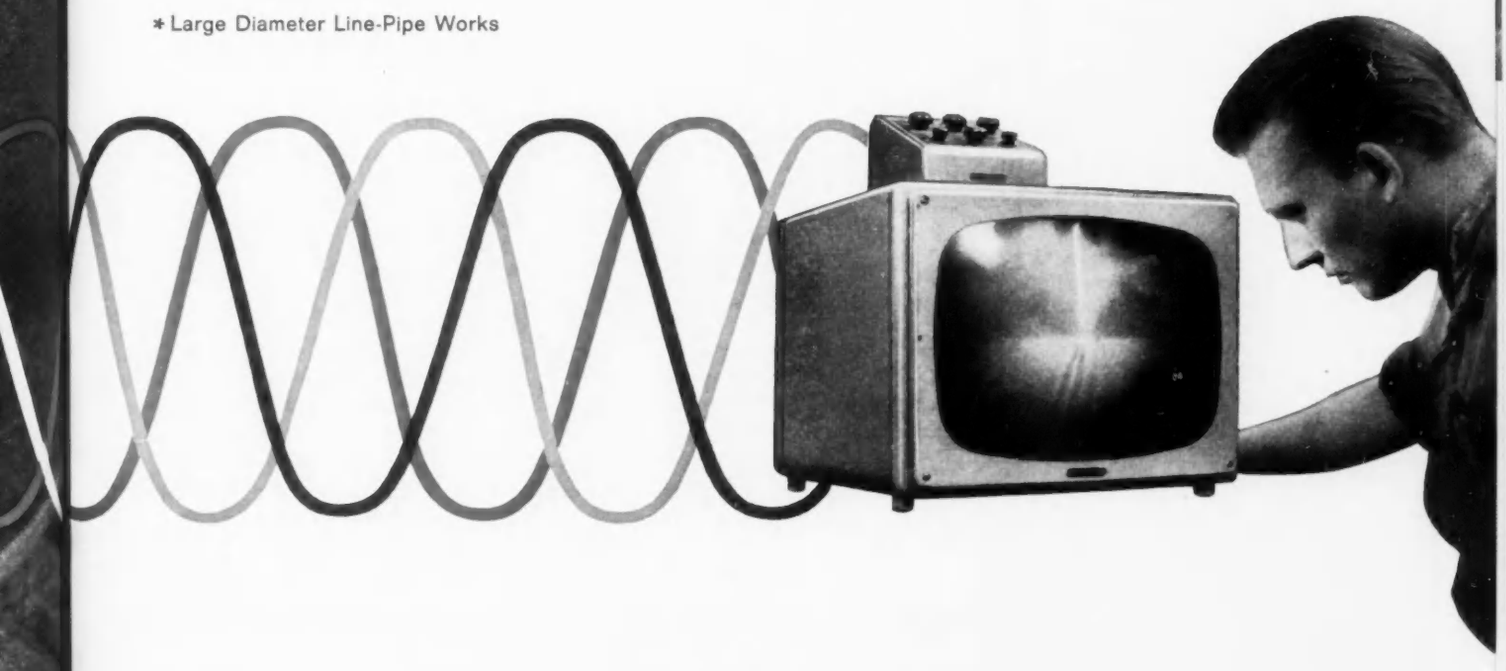
For more data on advertised products, use Readers' Service Cards, last page.



A private eye inside a line-pipe

This private eye at Großrohrwerk Mannesmann-Hoesch* is an electronic one and therefore able to watch every inch of the seam continuously from the inside during longitudinal welding. Control by TV is the most efficient way to ensure that you shall not have to dig up any section of your new Mannesmann-Hoesch pipelines. However, it is not the only way of testing; ultrasonic, magnetic, and X-ray methods are also available.
A whole team of experts also constantly watches every production process. Production of all Mannesmann-Hoesch line-pipes, from 6 5/8" to 42", is so thoroughly automated at all stages that human error is practically eliminated.

* Large Diameter Line-Pipe Works



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digging them up costs more!

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Only for a While

"Have a cigar?"

"No, thanks—sworn off smoking."

"Well, put it in your pocket for tomorrow."

A True Believer

He: "You ought to see the beautiful altar in our church."

She: "Lead me to it."

Ain't It the Truth

The longest word in the English language is the one which follows the phrase: "And now a word from our sponsor."

All in Our Life Time

The trouble with political jokes is that sometimes they get elected.

So, Have a Ball

Overheard at a party: "I'm glad I'm neurotic—it's the only normal thing about me."

Just a Passer-By

Stranger: "Say, I need help. Do you have a criminal lawyer in this town?"

Native: "Well, we're pretty sure we have, but we can't prove it."

A True Thinking Man

After a class toured the White House, the teacher asked each student to write impressions of the visit. One boy wrote: "I was especially glad to have this opportunity to visit my future home."

The Great Outdoors

"Did you fish with flies?" asked a friend of the returned vacationer.

"Fish with flies!" exclaimed the vacationer. "I hope to tell you we did. We fished, camped, dined and slept with them."

All the Time Decisions

Placard hanging in the office of a steamship company: "THINK—or thwim."

Our Growing Children

At a hospital, a nurse asked her new 3-year-old patient, "Have you ever had measles or chickenpox?"

"No," said the youngster helpfully, "but I've had Rice Krispies."

Pointing a Finger

A small-town editor found himself short of material so had his compositor set the Ten Commandents which were run without editorial comment.

After the paper was published, he received a letter which read, "Cancel my subscription; you're getting too personal."

More Truth Than Fiction

One reason folks get into trouble is that trouble usually starts out being fun.

Not the Choosey Type

One Sunday morning a New England Minister asked his assembled flock to rise if they wanted to go to Heaven. All stood up but one.

Puzzled, the Minister asked that those stand who wanted to go to Hell. Everyone sat still.

The minister pointed to the noncooperator and asked, "Where do you want to go?"

"No, where," he said, "I like it here."

Tots Will Talk

"Mammy, daddy wouldn't kill anybody, would he?"

"Gracious no, junior, why do you ask?"

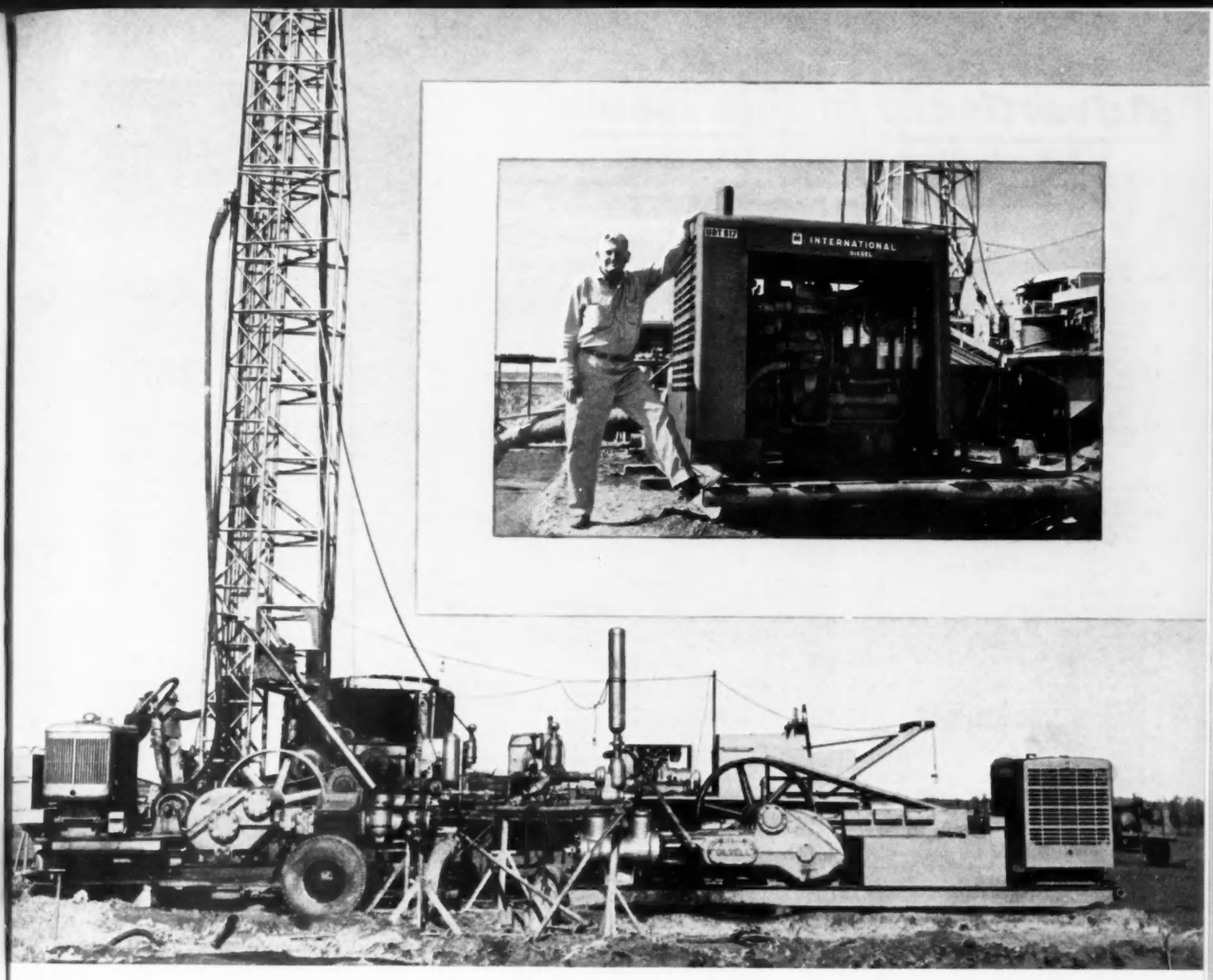
"Last night when he was in the basement workshop with the man across the street, I heard him say, 'let's kill the other one, Joe'."

A Trusting Soul

Some men will promise a woman anything and sometimes deliver, too. Witness the attractive young wife who said, "My husband promised me jewels and let me introduce you to my three daughters—Ruby, Pearl and Sapphire!"

I'll Buy That

We hope scientists discover that Mars is not inhabited. This country can't afford to stretch foreign aid any further.



35-year experience shows International *best oil field power!*

"I have worked the oil fields 35 years, and haven't found anything harder on men and equipment than just plain drilling. I like International engines for their toughness and ability to take rough use day after day and keep going. They can really take it!" —Andrew Dickens, Partner, Valley Oil Co.

Ask an old pro if you want the lowdown on power efficiency in the oil fields. Andrew Dickens, Valley Oil Co., Cottula, Texas, has been in the business for 35 years, and he knows a lot about engines. Mr. Dickens backs up his preference for International with facts. The Valley spread shown above is powered by four IH engines—a new UDT-817 and a UD-525 on mud pumps, plus two older and still efficient IH diesels on drill and draw works.

Experience is important to an engine builder, too. It's no coincidence that International, the world's oldest and largest producer of heavy-duty engines, also produces the most efficient power for heavy-duty applications. Thousands of customer records, kept over the years, show that International engines work harder and last longer on the tough jobs!

Your power requirements can be quickly and easily handled with a call to your nearby International Engine Dealer or Distributor. He has complete information on the 35 models—16.8 to 385 max. hp.—in the International line. Call him today!

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ENGINES

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A COMPLETE POWER PACKAGE

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• Dot preceding name of advertiser indicates that detailed data on products and services of the firm will be found in current 24th (1960-61) Revision of The Composite Catalog of Oil Field Equipment.

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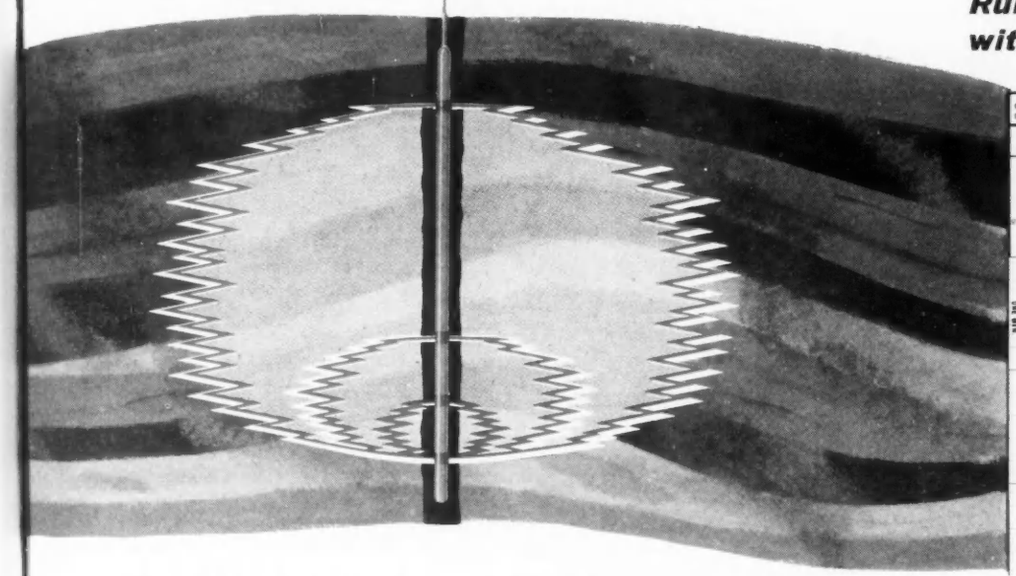

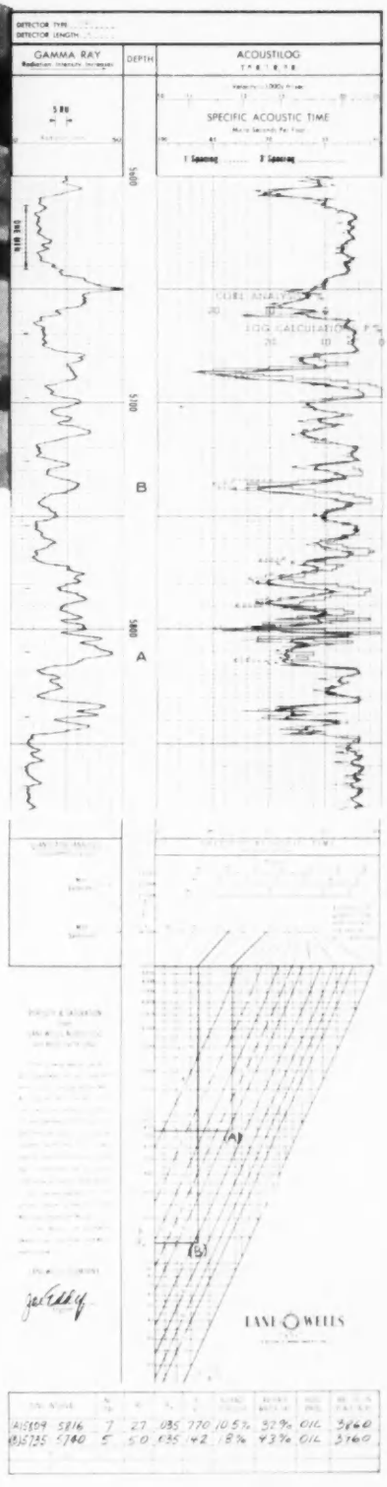

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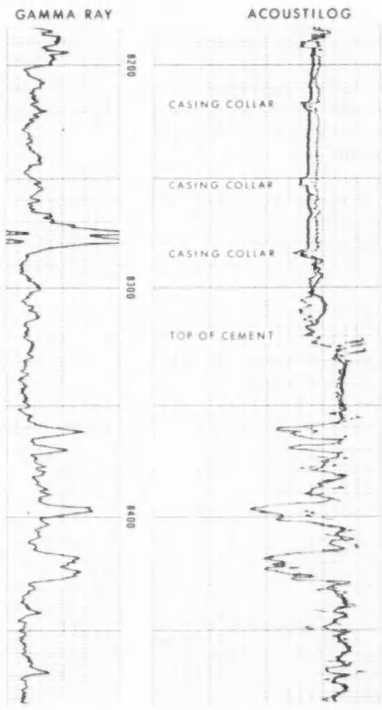

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Published monthly except semi-monthly in February and August by
The Gulf Publishing Company, Box 2608, Houston 1, Texas

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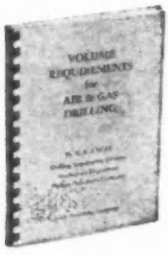

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